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The Diesel Again

IN *Flight* of July 25, 1935, there was published a leading article on the fire danger, and the Diesel position was outlined. The following week, August 1, we published the views of a considerable number of well-known British designers on the prospects of introducing the Diesel engine in place of the petrol engine. The consensus of opinion was that, although the advantages of the compression-ignition engine were generally admitted, the position of the petrol engine had been made virtually unassailable by the introduction of 87-octane fuels and the probability of 100-octane fuels coming into use before long. Mr. Roy Fedden, in particular, reviewed the position very thoroughly indeed, and he came to the conclusion that unless some firm were prepared to spend something like £100,000 on developing and tooling-up an engine, there was little hope for the Diesel. Mr. Fedden very rightly pointed out that the total requirements for commercial aircraft engines for Great Britain had in the past not amounted to more than twenty to twenty-five engines per annum, so that, unless this demand can be expected to multiply during the next few years, the Diesel engine as a commercial proposition seems to be right out of the picture.

This week we publish an article by Mr. Harry Ricardo on heavy-oil engines for commercial aircraft. Mr. Ricardo was abroad when *Flight* dealt with the subject a couple of months ago, but his views are entitled to respect, and it is felt that our readers will wish to see what such an acknowledged authority on aero engines thinks of the Diesel prospects.

Mr. Ricardo draws his comparisons from, and bases his views upon, experience with road vehicles—as indeed he was compelled to do, there being no information available concerning the Diesel in aircraft over prolonged periods. In spite of a tax of 8d. per gallon on the oil used, the Diesel has, as Mr. Ricardo puts it,

“hounded the petrol engine from the bus and lorry,” where fire risk is nothing like as serious; yet its use in commercial aviation has never been seriously attempted.

One must assume that Mr. Ricardo is fully aware of the difficulties, which are partly technical and partly financial. In his article he states definitely that “with the data available to-day from road transport experience, there should be little or no difficulty in producing a C.I. engine which would, I believe, meet all the needs of civil aviation, increase our reliability factor and save us from the ever-present horror of fire.” Elsewhere Mr. Ricardo says: “Against the C.I. engine we have to-day *only* its greater weight, which may now be of the order of 33 per cent.” We have italicised the word *only*, as it seems to us that, even on technical grounds, this claim is open to challenge.

Take-off Output

Mr. Ricardo is certainly aware that the modern tendency in British as in foreign commercial aircraft is towards much greater wing loadings. Indeed, this is inevitable if the higher cruising speed demanded is to be obtained at a reasonable power expenditure. One very great advantage of the petrol engine is that, with the new fuels, it will give a very high specific power output for take-off. It is conceivable that the Diesel engine, even if it were otherwise on an equal footing with the petrol engine, would not develop sufficient specific power to make the take-off of the modern aircraft possible. A Diesel-engined aircraft which was barely able to struggle off the ground might possibly be far more dangerous, although in a different direction, than the petrol-engined aircraft with a good surplus of power.

It is not necessary to be in the confidence of the powers-that-be to be aware that the British commercial air policy during the coming years is to be based very largely on the flying boat. It may be taken for

granted that the wing loading of the new flying boats now being built will be very much greater than we have been accustomed to in the past. It may also be assumed that on some of the Empire air routes fairly long stages will have to be flown. Consequently the long-range flying boat more than any other aircraft should be the type most likely to benefit from the Diesel engine. But it may be questioned whether the stages contemplated are anything like long enough to enable the Diesel to make up on its specific fuel consumption what it loses on its specific weight. And, unfortunately, the flying boat, and more particularly the flying boat with heavy wing loading, is very much in need of extra power for the take-off. Could the Diesel be made to give this? Mr. Ricardo is better qualified than we to give an answer to that question. Again, the fire risk in a four-engined flying boat is probably far smaller than in the corresponding aeroplane. Over the sea there are no unexpected hills into which the machine might fly in poor visibility, so that here again the type of aircraft which is most likely to benefit from the Diesel on other grounds seems to be least in need of the protection against fire-risk.

On the financial side there is, perhaps, little need to dwell. Mr. Fedden's estimate of £100,000 for a rela-

tively insignificant return in the form of orders shows conclusively that only the Government could undertake the development work. Even if this were done and a suitable engine produced, there would still be the cost of arranging supplies of oil fuel along the Empire air routes. Presumably these would, for a start at any rate, have to duplicate the petrol supplies, and the cost to the operating companies would be very considerable and would go a long way towards cancelling the initially lower cost of the fuel oil.

When we come to airships, the problem assumes a rather different aspect. The airship is first and foremost a long-range aircraft, and particularly a long-duration one; weight is not quite as important as in heavier-than-air types, and the fire risk always appears serious, although probably it is smaller than one is apt to assume. A very good case can be made out for using Diesels in airships, and it may be recalled that the R.101 was fitted with Beardmore Diesels; the fire which destroyed the airship was from the hydrogen and not from the fuel oil. The new L.Z.129, some impressions of which are published in this issue, is to be fitted with Daimler Diesel engines, and as the gas bags are to be filled with helium the fire risk in the new Zeppelin should be almost nil.



GLIDING FROM A GLACIER: An impressive view of the snow-covered glacier which formed the ground for the recent Jungfrauoch gliding meeting in the Bernese Oberland. In the background is the Eiger Peak (3,974 ft.).

The Outlook

A Running Commentary on Air Topics

Aero Engines in Cars—

IT is a very significant fact that aero engines are playing such a prominent part in land speed events. We have Sir Malcolm Campbell, who was officially welcomed back to England on Tuesday of last week, using a Rolls-Royce engine in his huge car in order to attain the speed of 301.129 m.p.h. on the salt lake at Utah. Then there is Mr. George Eyston, who, with the help of Flt. Lt. C. S. Staniland and Mr. A. Denly, also achieves great things with a Rolls-Royce engine—they actually covered 1,729 miles in twelve hours. Finally, Mr. John Cobb, running easily at well below his top speed, wins the 500 miles race at Brooklands with his Napier-Lion-engined car at the record speed of 121.28 m.p.h.

A point of immediate and vital interest to us in aviation is that these aero-engined cars do not seem to suffer from engine trouble, whereas cars with engines built as car engines drop out of races such as the 500 miles in distressingly large numbers.

That point should be remembered when it is thought that the price of aero engines is unduly high; and do not forget that this regularity of running is equally applicable to the smaller aero engines, as is seen in the King's Cup Race year after year.

—And Car Engines in Aircraft

SEVERAL attempts are being made, notably in America, to reverse the process and fit car engines in aeroplanes. William B. Stout, president of the American Society of Automotive Engineers, has something to say on this subject in the current issue of our American contemporary *Aero Digest*. "Right now," remarks Bill Stout, "there is great talk in Washington of automobile engines being put into airplanes, and no doubt before long there will be a great hullabaloo about an airplane flying powered with an automobile engine. This will be called a great achievement for the master minds. It must be remembered, however, that airplanes were flown fifteen years ago with Model T Ford engines, just as one might drive a five-ton truck with a motor cycle engine and get a lot of publicity."

Continuing his argument, Bill Stout says: "An automobile engine as we know it to-day will never be made into an airplane engine, so cross that off your list. Very shortly, however, as the automobile man begins to get smart enough to know what has been going on in the airplane business, he will start to build airplane engines for automobiles. And when Henry Ford or Walter Chrysler, or Mr. General Motors, starts turning out these engines for a thousand motor cars per day, and can side-track a few of them to be put into airplanes, then we may see a 200-dollar engine for our private-owner craft. . . . Let me repeat again, automobile engines will never be used for practical aircraft of any type until aircraft engines become standard for automobiles. I trust I make myself clear."

Quite, Mr. Stout, thank you.

The "Cheap" Aeroplane

STOUT also has something to say about the "cheap" aeroplane. His remarks are obviously directed towards Mr. Vidal and the American Department of Commerce, but their truth has a much wider application. "The first reaction of any unthinking man toward a modern automobile," Mr. Stout writes, "is that Mr. Ford and the rest have evolved a 'cheap design,' which, because

of its cheapness, can be made for 700 dollars or less. Even more unthinking people than these look over an airplane and, finding that it has fewer parts and less weight, immediately say 'You should build this for 700 dollars or less.' The fact of the matter is that no motor car to-day is a cheap design. If it were, nobody would buy it. On its own merits, the so-called cheap car—which is really a low-priced car—is a better automobile than the high-priced heavy car. The reason is that the cheap car is built in large quantities, and by that I mean more than 1,000 per day. This quantity makes the car low-priced, though high in quality, remarkable in engineering, and luxurious in appointments. Airplanes will be built equally as well and equally low-priced when they are made and sold in equal quantities per day. Under any other circumstances broadcasting the statement that one can build a 'cheap' airplane and sell it for 700 dollars, or anything near that price, indicates a pathetic ignorance of the problem at hand.

"What this country can do, and should be encouraged to do, is to build the best possible completely equipped private-owner airplane that can possibly be turned out at any cost, and, after that, start talking the banker angle of finance, which is not a very important matter, anyway. You can sell a 20,000 dollars two-engined, radio-equipped, automatic pilot, sound-proofed, private-owner airplane to a customer who has the money to pay for it, and to hire an experienced pilot who knows how to fly it, for no more sales cost (and perhaps less) than to sell a cheap airplane to an enthusiastic but financially embarrassed and irresponsible youngster who doesn't really know what it is all about."

A Record We Should Have

IF there is one type of aeroplane in the construction of which Great Britain excels it is the high-speed fighter. A British machine in this class was the first of its type to pass the 250 m.p.h. mark, and it is reasonably certain that we shall have practical 300 m.p.h. fighters in the air before any other Power.

It does seem, to say the least, regrettable that, with all our accumulated knowledge of high-speed land machines, we should not have attacked the landplane speed record.

This, at present, is held by Delmotte, who did 314.321 m.p.h. in a 400 h.p. Renault-engined Caudron, although lately Mr. Howard Hughes is said to have established an unofficial mark by averaging 337 m.p.h. in both directions over a measured mile. He was using a cantilever monoplane with a boosted Twin Wasp Junior radial giving 1,000 h.p.—a figure which has been the subject of a somewhat derisive comparison from French quarters. But it must be remembered that every additional m.p.h. above the figure already reached has to be fought for hard. The Twin Wasp Junior, of course, is a radial type; America is not shining these days as a producer of high-powered liquid-cooled or air-cooled in-line engines.

It seems, then, reasonable to suppose that one of our new fighters which are coming along could be groomed to bring the record over here. Or, better still, will not some sportsman come forward and order a special machine for the job? When one remembers that the Comet, a twin-engined type, would do about 275 m.p.h. with super-charged engines, and that the Bristol 140—a cabin machine powered with two radials—approaches that figure quite closely, one is reassured that we should have little difficulty in bringing home the record with a special racer or a converted fighter.

L.Z. 129

NEARING COMPLETION

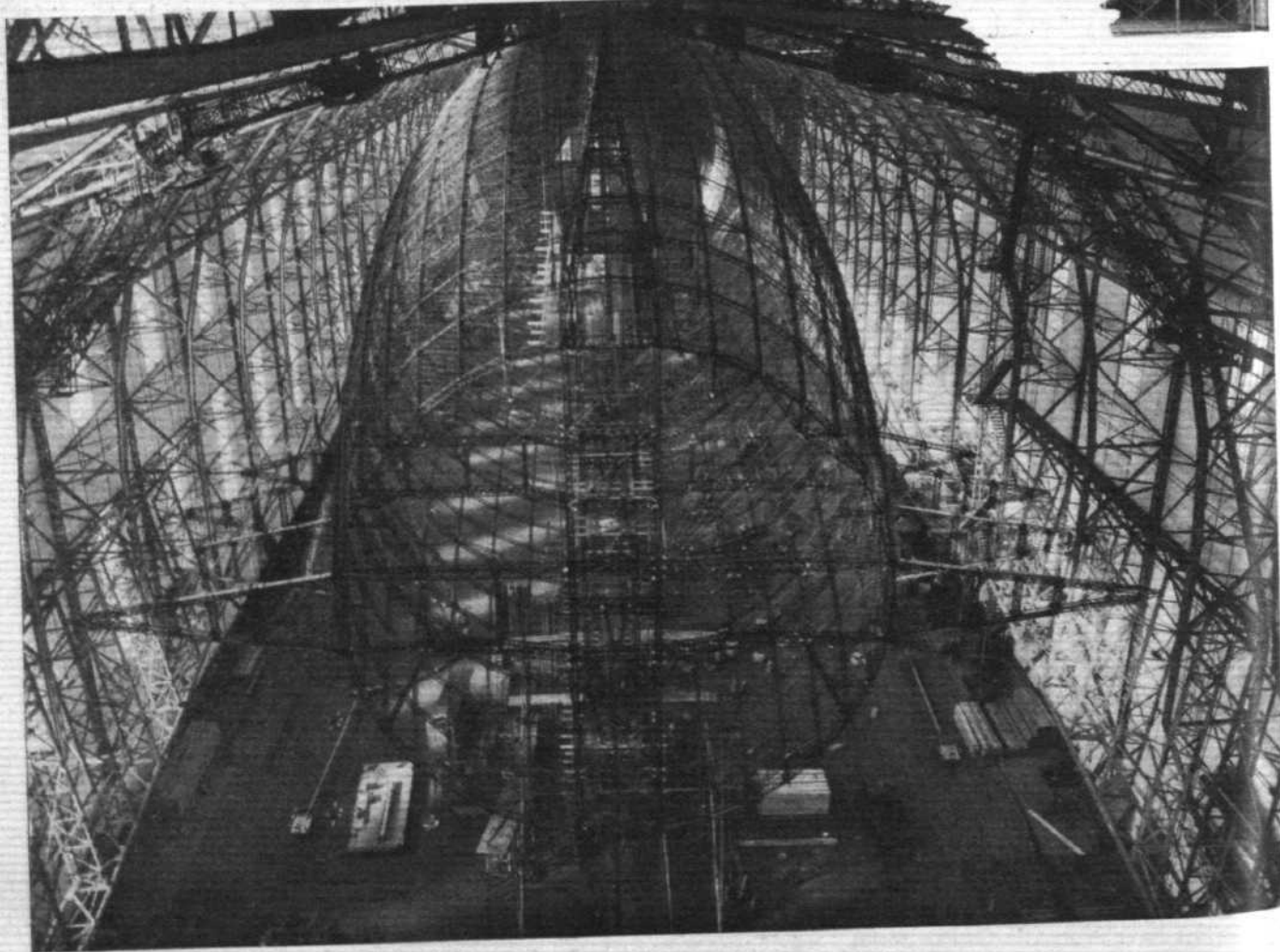
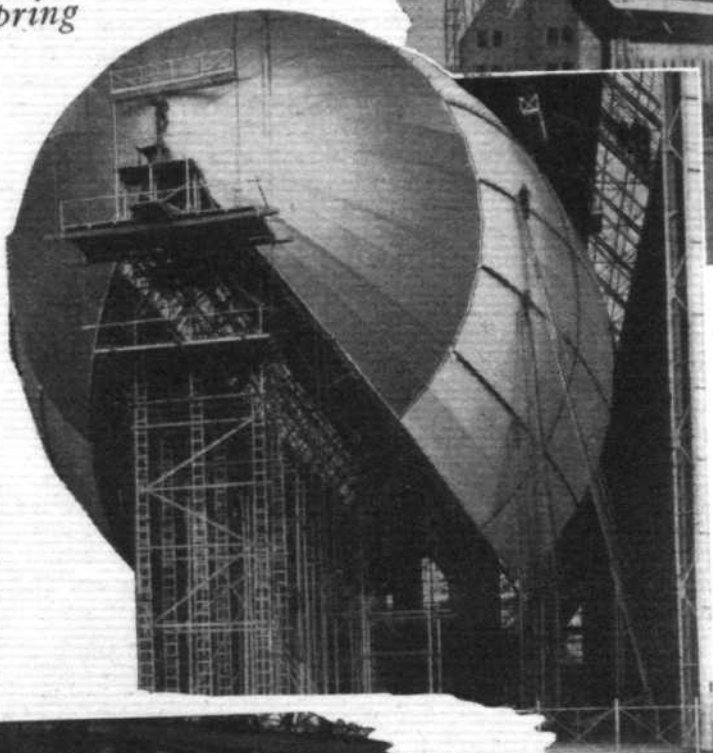
The Largest Zeppelin, Filled with Helium and Having Diesel Engines, to Go Into Service Next Spring

By G. GEOFFREY SMITH
Managing Editor of "Flight"

REPRESENTING the fruits of thirty-five years of accumulated experience in the manufacture of airships, the new Zeppelin L.Z. 129 is now approaching its final stages of completion. It will be the biggest airship in the world and is expected to prove more efficient, faster and more practical than any previous design. It took twelve months to scheme the design on the drawing board, and for two years hordes of workmen have been engaged upon the construction of its complicated framework.

Now, in the course of a month or two, initial trials will be made, and if, as is confidently expected, the tests prove satisfactory the airship will be placed upon the Atlantic routes in the spring. It is expected that the maximum speed will be in the neighbourhood of 84 m.p.h.

Last month, during a tour in Germany, I visited the Zeppelin works at Friedrichshafen, at the western end of Lake Constance, and was courteously escorted over the ship by Dr. Lempertz, himself a Zeppelin commander. Its size is immense, and to see its huge form, now covered with its envelope, save for small sections around the fins,





Bottom left) The completed skeleton before receiving its covering. The cantilever construction of the fin framework will be noticed.

Left) L.Z. 129 with the covering almost completed.

Above) The new airship in its hangar, with the famous *Graf Zeppelin* flying above.

Right) This view gives a graphic impression of the intricacy of the framework and internal wire bracing.



is impressive indeed. It almost entirely fills the lofty hangar, which had to be specially built before production could proceed, for no existing workshop could suffice.

In two years the airship has grown up piece by piece and section by section, the method of assembly of the parts being to suspend the top portion from the roof and support the underside by a forest of scaffolding. Electric cranes at dizzy heights flit along the hangar sides, lifting the different sections into position. The framework gives one the impression of a huge maze of complicated metal construction, yet, as the eye becomes accustomed to the general scheme, one recognises a beautiful curvature of the hull, the careful trussing and triangulated construction of every part. Big sections of metal, which appear forbidding in strength and apparent weight as they lie on the ground, I found I could lift with consummate ease. Tanks of great capacity, as tall as a man, can likewise be lifted off the ground single-handed. Scientific weight-saving is of paramount importance in airship construction, and practically the whole of the metal parts of the ship are in duralumin or other aluminium alloys of extraordinary strength and lightness.

The new airship measures no less than 813.65 ft. long, its diameter 135.2 ft., and the capacity 6,709,804 cu. ft. For the first time in Zeppelin practice the new ship is to be filled with helium. Power will be provided by four Daimler diesel-type oil engines developing a total of 4,400 b.h.p., the engines being carried in gondolas separate from the main hull, two on each side. There are two other smaller engines, also Daimler diesels, driving generators to supply current for the electric kitchen, hot-water supply, and the 300 lamps with which the ship is equipped.

The carrying capacity is naturally far greater than that

of any previous Zeppelin. One hundred and fifty passengers may be accommodated, and there is sleeping accommodation for fifty persons in the twenty-five two-berth cabins, apart from the crew, numbering forty-eight. Each cabin has a wash-basin with hot and cold water and a wardrobe, and there are shower-baths. There are no sides to the cabins, but thin silk material of grey colour is stretched over the metal framework to partition them off.

Two decks have been arranged on the lower or B deck; on the smaller of the two there is a smoking room, detached from the other compartments, which consist of a chart-room, officers' mess, and electric kitchen and lavatory accommodation, while on the upper or A deck there is a large room on either side, one the lounge and reading room, the other the dining room. Between these two rooms, which, incidentally, have windows extending their whole length to provide panoramic views of the scenery, the series of cabins is arranged, and it is possible to shut off certain cabins at the forward end to form a suite. The floors everywhere are of corrugated aluminium, $\frac{1}{2}$ in. thick, and supported by frail-looking but extremely strong girders, triangulated to increase stiffness.

Well aft of the passenger accommodation are the quarters for the crew, two in each cabin, which are of

small dimensions. A separate messroom adjoins, and nearby is a huge compartment for luggage—large enough indeed for an aeroplane or cars to be transported, as is the intention when occasion demands. Every room has provision for conditioning the air. Hot or cold air may be induced at will, since the ship is intended to visit many lands of widely varying temperatures.

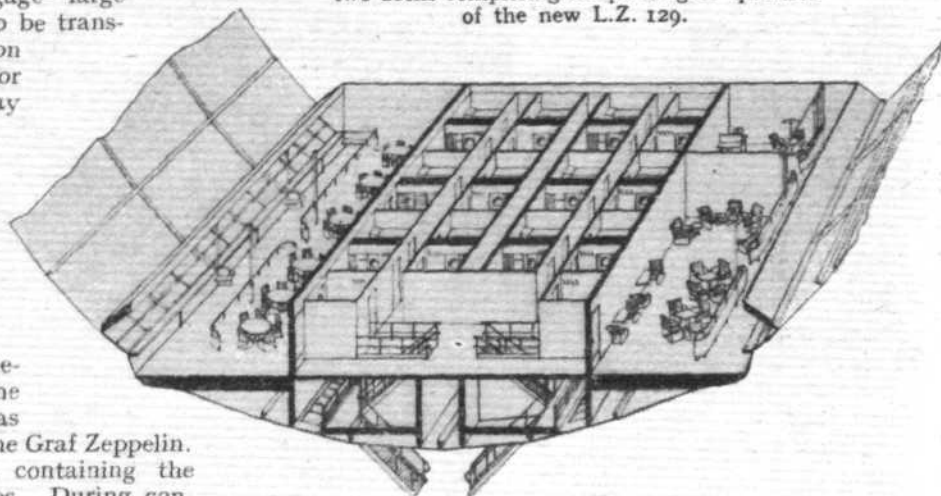
The control or pilot car projects from the bottom of the main hull forward, as is usual with Zeppelin designs, and in the nose is the commander's office, with the flying controls and instruments. Rearward is the navigator's compartment, and, immediately above, the wireless cabin. The floor space of this new ship is as much as 4,306 sq. ft.—over four times the total of the Graf Zeppelin.

There are sixteen separate gas cells containing the helium, and each is provided with valves. During construction the components of each bay or section were numbered and coloured distinctively so that work could proceed with each section independently. At the stern, inside the main frame, strong cross-girders have been incorporated in the form of a transverse cruciform, which is a new development and should greatly increase rigidity at a vital point, since the cantilever construction of the fin framework projects from this section. All along the ship there are longitudinal auxiliary girders to maintain and strengthen the outer form of the ship.

Since the engines are oil-driven and helium is to be used for the gas bags the risk of fire has become almost negligible. The oil fuel for the six engines will be carried in a large number of cylindrical tanks, each about 8ft. by 4ft., and carried in the keel of the hull and alongside the catwalk, where they are readily accessible by the crew during flight. The total tankage capacity is 132,277 lb.

Another new feature is the adoption of huge balloon

This sketch gives an idea of the layout of the two decks comprising the passengers' quarters of the new L.Z. 129.



tyres for the pilot car at the forward end, and also for the lower tail fin. These should considerably assist manoeuvring when the airship is on the ground.

At the time of my visit workmen were busy applying the last sections of the outer covering or envelope. The method is to stitch large strips of the material together to ensure a perfect joint, as the junctions must be perfectly streamlined to reduce wind resistance. Since this is very important work, the workmen are called "tailors." The covering material itself is treated with a dull-red composition inside to ward off the rays of the sun and to render the interior shadowproof. The exterior is covered with a tightening dope of silver to reflect heat.

One could continue indefinitely describing the wonderful fittings of this ambitiously schemed airship and its tastefully arranged furniture of plain modern style, in which chromium figures largely, but space forbids.

A NOTABLE FRENCH EFFORT

The Caudron-Renault Typhon High-speed, Long-range Monoplane

IN *Flight* of June 14, 1934, was published an advance description of a Caudron feeder-line machine, known as the C.440. Since that time the Caudron Company has developed a long-range high-speed monoplane incorporating several of the features of that type, but smaller in size. This latter resembles in a number of ways the De Havilland Comet, but at the same time bears the stamp of M. Marcel Riffard, the Caudron designer. It has been named the Typhon. Four examples have been ordered by the French Air Ministry for long-distance flights and fast mail-carrying experiments.

The machine according to our French correspondent, shows evidence of great structural efficiency and has a high performance.

Two-spar construction is used for the wing, which is of bi-convex section, and is constructed in one piece. The spar flanges are of spruce and the webs of plywood. Birch plywood, doped, polished, painted and varnished, is employed for the wing covering. At the junction of the wing with the fuselage the chord is 9ft. 3in., but at the tip it is only 4ft. 11in. There is also a variation of thickness and camber throughout the wing. The tips are of elliptical form in plan view.

Ailerons extend for about one half of the trailing edge, and split flaps, about one-third of the main chord in depth, take up the remainder of the span. The junctions of wing and fuselage are carefully filleted.

An adjustable tailplane, constructed on similar lines to the wing, is fitted. The elevators are mounted on ball and socket joints and are fabric covered. The fin is structurally similar to the tailplane, and the rudder, like the elevators, is covered with fabric.

Of typical straight-sided Caudron design the fuselage is fabric covered. The cockpits for pilot and passenger, which are set well back in the fuselage, are fitted with sliding transparent hoods.

The undercarriage consists of two independently mounted wheels on cantilever struts embodying hydraulic shock absorbers and retracting into the rear portion of the engine nacelles. Hydraulic retracting mechanism is employed.

Power is provided by two six-cylinder Renault inverted air-cooled in-line supercharged engines of 9½-litres capacity each. Rated at 220 h.p. at 2,500 r.p.m. they give 265 h.p. each at 6,560 tect.

The main fuel tanks are in the forward portion of the fuselage, ahead of the cockpits, to the rear of which is mounted an auxiliary tank. In the machine which was tested recently at Guyancourt Aerodrome provision is made for 334 Imperial gallons of fuel, which should suffice for a range of between 2,800 miles and 3,100 miles. It is possible, however, to increase this amount. The oil tanks are located in the wings between the engine nacelles and fuselage.

Electrically operated Ratier variable pitch airscrews are employed. The blades of these may be adjusted in flight to any pitch desired by means of a small electric motor of one-tenth to one-sixteenth horse-power, mounted within the hub.

The main data applying to the new Caudron are as follow:

Span, 47 ft.; wing area, 302 sq. ft.; length, 35 ft. 7 in.; height, 9 ft. 9 in.; weight empty, 3,718 lb.; gross weight, 7,480 lb.; maximum speed at 6,560 ft., 225 m.p.h.; cruising speed at 6,560 ft., 202 m.p.h.; range (according to amount of fuel carried), 3,200 miles to 4,400 miles.

Rewa's New Aerodrome

THE MAHARAJA OF REWA, in Central India, is constructing an aerodrome in his State. The site is between Satna and Rewa. This should prove of considerable value when internal air lines are established in India, and particularly to the service between Bombay and Northern India.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Alert

Seven thousand men and women have been trained by the St. John Ambulance Brigade in London for duty in the event of air raids.

Yugoslavia Orders Furies

The Yugoslavian Government has ordered ten Hawker Fury single-seater fighters generally similar to those now being produced for the R.A.F.

—And Kestrels

Another order has gone to the Rolls-Royce Company for seventy-five supercharged Kestrels of the latest type. Both the orders for aircraft and engines were obtained in the face of Continental competition.

New German Attaché

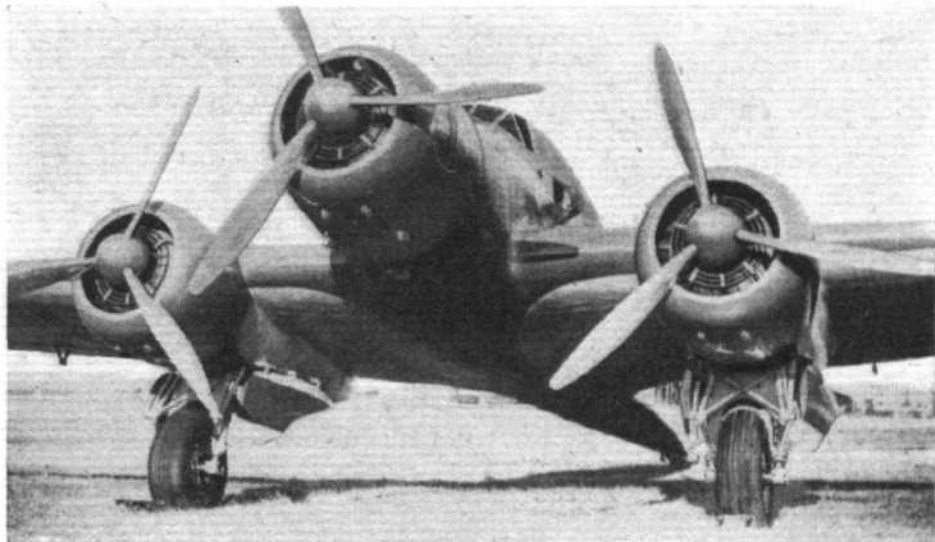
Colonel Ralph Wenninger arrived from Berlin on Monday to take over the duties of Air Attaché at the German Embassy. Hitherto, Germany has had no Air Attaché in London.

Blessing of Civilisation

Mussolini's chemical warfare section has prepared a set of four double-sided gramophone records giving verbal instructions for protection against gas. Reduced rates are available for schools, clubs, institutions and recreational organisations.

A Handsome Gift

Lord Wakefield has presented the flying club of Northern Rhodesia with sufficient funds to purchase and maintain an aeroplane. There is great enthusiasm for aviation in Northern Rhodesia, and a large number of would-be pilots in this area will now be enabled to realise their ambition.



A CHANGE IN CHARACTER. This is a bomber version of Italy's Savoia Marchetti S.79 high-speed commercial monoplane. Recently, flown by Major Attilio Biseo, it broke the following records: 1,000 km. with 500 kg., 100 km. with 1,000 kg. and 2,000 km. with 500, 1,000 and 2,000 kg.

Keys on the Quay

A lady passenger in the *Majestic* arrived on board at Southampton to find she had left the keys to her luggage at home in Cranford, Middlesex. Many a fine lock was doubtless saved from destruction by an aeroplane which flew over the quay and, as the liner was about to sail, dropped the necessary bunch.

Educational Enterprise

So many boys of Rossall School have shown a desire for instruction in matters aeronautical that the School Council has decided to include in the curriculum courses in aero engine and aeroplane construction. The school racquets courts

will be altered and extended to form an aerodrome, and the headmaster is arranging for the provision of an aeroplane.

700 m.p.h.

On the recommendation of Colonel Lindbergh and Mr. Harry F. Guggenheim, the Daniel and Florence Guggenheim Foundation has agreed to furnish funds to Professor R. A. Goddard Clark, who has perfected a device for stabilising rockets. The Professor has been experimenting since 1907 with power-propelled rockets, and for the past fifteen years with liquid propulsion. His 12ft. models "take off" at 700 m.p.h.

Russia's Loss

Tsiolkovsky, the Russian designer of metal airships and aeroplanes (it is said that he was developing the idea of a metal-framed dirigible several years before plans for the first Zeppelin were drawn up), died on September 19. A self-taught man, he completed a course of higher mathematics at seventeen, and by the time he was twenty-two was earning a living by giving private lessons, devoting all his spare time to experiments.

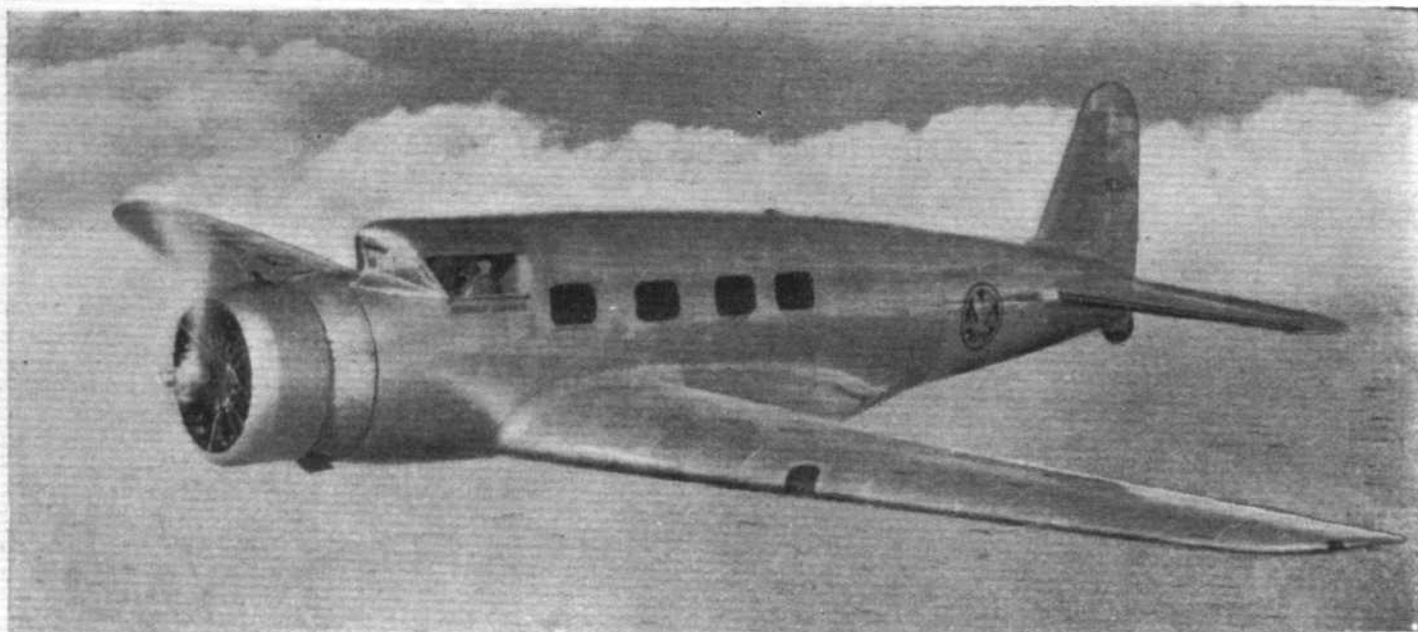
Twenty-five Years Ago

(From "Flight" of October 1, 1910.)

"Last week, at the Farman school at Etampes, Mahieu, after giving lessons to a number of pupils, picked out the two heaviest, each of whom turns the scale at 12 stone; then, perching them up behind him on his Henry Farman biplane, he took them for a lengthy jaunt over the aerodrome."



READY FOR REHEARSAL. Some—if not all—of Germany's Heinkel single-seater fighters (B.M.W. engines) waiting to play their part in manoeuvres near Warnemund recently. The tail in the foreground is that of Udet's aerobatic Curtiss Hawk.



An English Pilot Tries

The Vultee—eight passengers, 215 m.p.h. cruising, one engine.

TWO AMERICAN MONOPLANES

IT is not often that one is privileged to try out foreign aircraft in the country of their origin, so when, during a recent visit to the United States, I was given this opportunity I seized it with alacrity.

The two machines with which I shall deal are both single-engined jobs, but there any similarity ceases. I chose them because they are at opposite ends of the scale, and I am therefore relieved of the doubtful pleasure of comparing them.

The first is the Vultee, which I flew by invitation of Mr. E. L. Cord, whose Aircraft Development Company's plant I visited at Los Angeles.

I had heard a great deal about the impression the Vultee had made on American pilots—how it was, perhaps, one of the nicest machines most of them had flown, how comfortable it was, and how its high cruising speed was revolutionising their ideas of air transport schedules. For that reason I had begun to think that this aeroplane must be

Contrasting Types—the Eight-passenger Vultee Transport and the Fairchild Cabin Three-seater : Many Likeable Characteristics Found in Both

By C. N. COLSON

a veritable paragon, and I wondered where the snags, if any, lay. Now, after handling the machine (ought I to say "ship"?) myself, I am not only as enthusiastic as they, but even go further and wonder why a Vultee has not been sent over here and why the licence has not been taken up by one of the firms who have recently been in the public eye in the matter of obtaining licences.

Except for the forward-sloping windscreen, general cleanliness, retractable undercarriage, and certain details of manufacture, the Vultee does not differ radically from many other all-metal low-wing monoplanes

with radial air-cooled engines; but the combination certainly puts it in a class by itself. The forward-sloping windscreen eliminates reflections of the kind which make it difficult for a pilot to look out when there is a background of bright clouds and also adds several m.p.h. to the speed. The efficacy of this feature has, it will be

VULTEE MODEL V-1A

Wright Cyclone F-2: 735 h.p. at 1,900 r.p.m.

DIMENSIONS.		ft.	in.	m
Length overall	...	37	0	(11.3)
Height overall	...	10	2	(3.1)
Span	...	50	0	(15.2)
Dihedral (top of wing)	...	3	deg.	

AREAS.		sq. ft.	m ²
Wing, total	...	384	(35.7)
Alarons	...	22.7	(2.1)
Tail plane	...	88.6	(8.1)
Elevator	...	32.5	(3.0)
Fin	...	9.9	(0.9)
Rudder	...	14.1	(1.3)

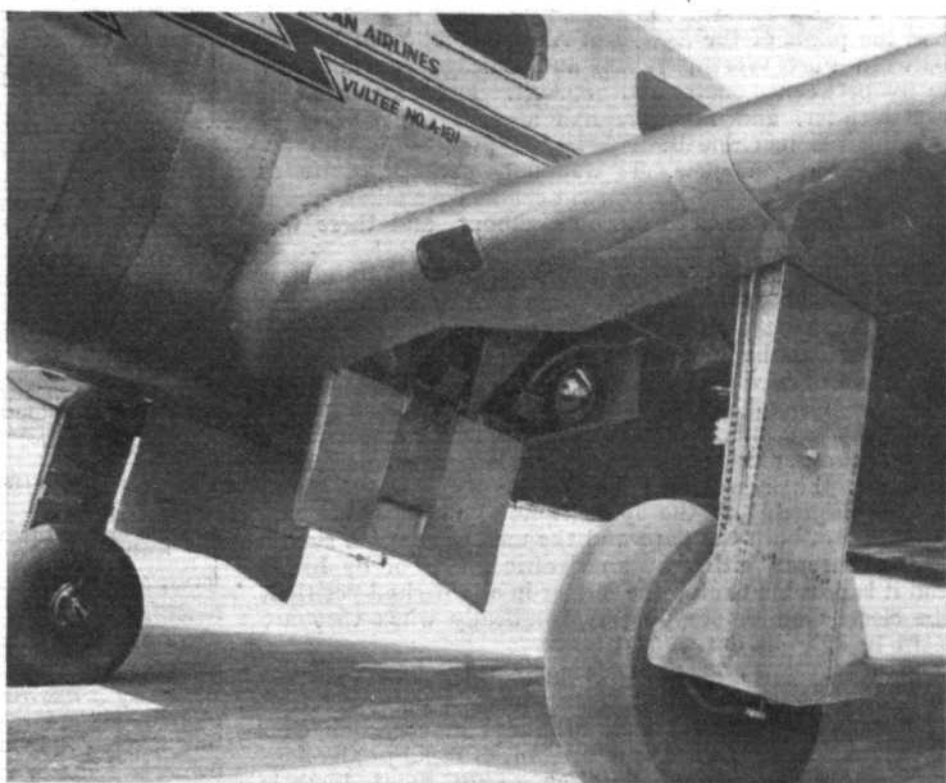
VOLUMES.		cu. ft.	m ³
Cabin	...	250	(7.1)
Mail compartment	...	40	(1.1)
Baggage compartment	...	50	(1.4)

WEIGHTS.		lb.	kg
Empty	...	5,382	(2,441.2)
Petrol, 172 gall. (782 l)	...	1,236	(555.3)
Oil, 12.5 gall. (57 l)	...	113	(51.2)
Pilots (2)	...	340	(154.2)
Payload, 8 passengers	...	1,360	(616.9)
Baggage and mail	...	60	(27.2)
Gross weight	...	8,500	(3,855.5)

PERFORMANCE.		m.p.h.	km/h
Top speed	...	235	(378.2)
Cruising speed (75 per cent. power)	...	215	(346.0)
Landing speed	...	70	(96.6)
Climb at sea level	...	1,000 ft. per min.	(5.08 m/sec)
Absolute ceiling	...	22,000 ft.	(6,705.6 m)
Service ceiling	...	20,000 ft.	(6,095.0 m)

Note.—These figures include Western Electric two-way radio and two airways type three-minute flares.

This view shows the Vultee's retractable undercarriage, with one of the wheel wells and automatically closing cover. Note also the concealed landing light and, on the leading edge, the indirect ventilation intake.



remembered, been proved in this country (as witness the result of the King's Cup Air Race) by Mr. F. G. Miles in his Falcon, and also in his Merlin.

The cleanliness, achieved by careful attention to detail construction, wing-root and tail fairings, as well as other not-so-readily discernible points, results in a high performance, and also maintains a clean flow over the tail controls, so that there is ample control at all speeds and no evidence at all of those two bugbears of low-wing design—buffeting of the tail plane at large angles of incidence and sudden loss of elevator and/or rudder control when landing.

I found the machine perfectly delightful to fly and quite unusually steady in bad weather. She has, of course, the fairly heavy "big ship" type of controls to be found on most American air transport machines, which require only a minimum of movement. It is possible that English pilots will expect something lighter on a machine of this size, but, personally, I think the American standard is best, particularly when it is remembered that the Vultee cruises at speeds of over 200 m.p.h.

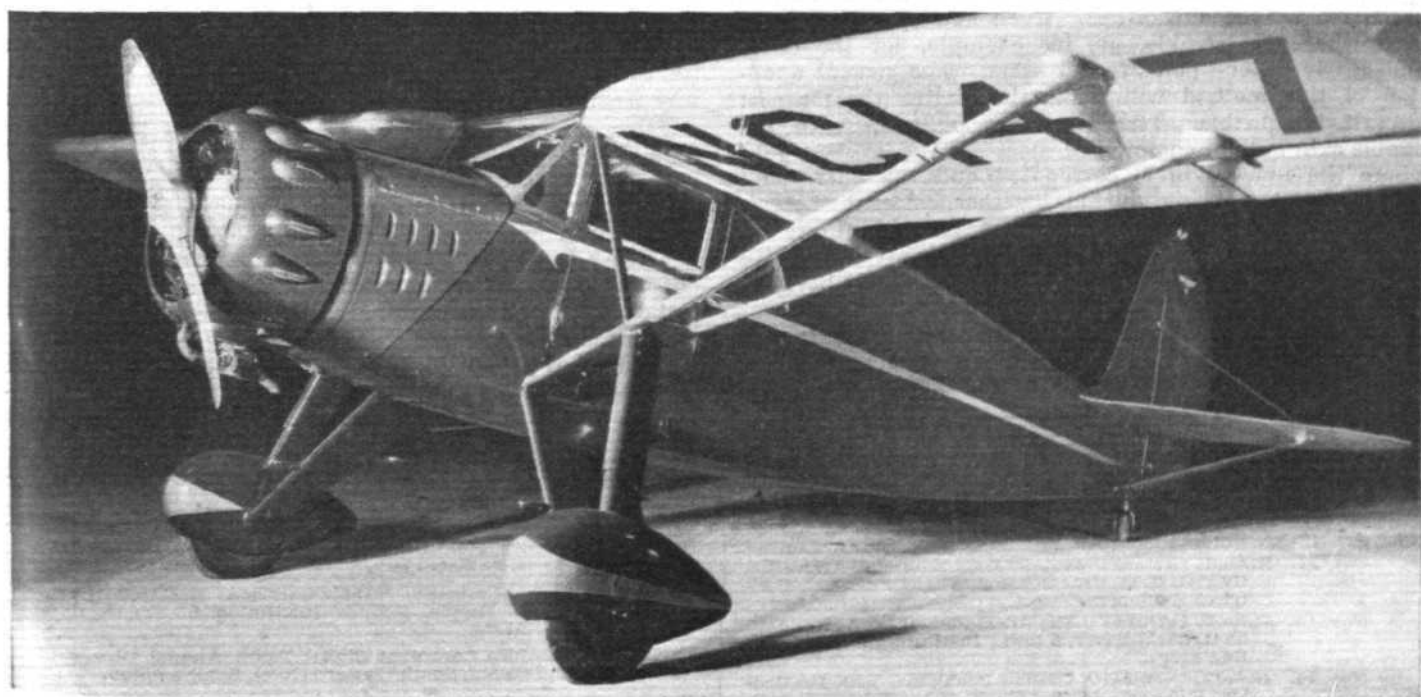
The speed of this machine makes it a most desirable transport aircraft and, at the same time, leads one to think very seriously of its possible military value. A machine of this construction could literally be sprayed with machine-gun bullets without any vital part being hit, and even as a transport machine its performance is away above that of many light bombers.

A large cabin seating eight people in comfort, a lavatory, ample baggage accommodation, and a pilot's cockpit with full dual control; all this sounds a pretty big lump to expect a normal single-engined machine to carry, but this

is what the Vultee achieves, and at over 200 m.p.h.!

The Wright Cyclone engine is supercharged and, using 87 octane fuel, with a boost pressure of about 36/38 in., the power output for the take-off is between 700 and 800 h.p., but once in the air the power taken is normally decreased greatly.

Flying between San Diego and Los Angeles, a distance of 127 miles, which I covered in thirty-four minutes, I maintained an altitude of 5,000 ft., and, according to the engine chart, the boost pressure of 25 in. meant that I was taking only 425 h.p. out of the engine, but, nevertheless, the A.S.I. registered a steady 195 m.p.h. Allowing for the altitude and temperature (it was very hot outside, indeed, some 85 deg. on the ground), we must have been doing over 200 m.p.h. comfortably, the fuel consumption then being about 38 gallons per hour.



The 1935 Model of the Fairchild "24" three-seater cabin monoplane as flown by the author of this article. A 145 h.p. Warner Super Scarab is to be found beneath the scalloped cowling.

At a higher altitude the economy is even more marked, and the pilots of the American Air Lines who use Vultees between Fort Worth, Texas, and Chicago generally try to fly between 8,000ft and 10,000ft. I made that flight myself later, and therefore had a good opportunity of judging the machine both from the passenger's and the pilot's points of view. It was not, perhaps, quite as quiet as some of the larger twin-engined machines but it is very easy to talk to one's neighbour, and there was an outstanding lack of vibration.

A performance of this nature is, of course, quite useless if the take-off and landing characteristics are bad, but in the Vultee they are definitely good. When necessary the flaps can be lowered a few degrees and, with the engine throttle wide open, the machine can be taken off in quite a small space, but even without the flaps, or using the maximum allowable engine boost, the take-off is of the order of 15 sec. Landing is perfectly straightforward; the flaps provide as coarse a gliding angle as can be desired, and the speed is not unduly high. The operation of both the flaps and the undercarriage is simple in the extreme, either by an electric motor or by hand, and it is possible to stop the former in any desired position, the electric motor stopping automatically when they are right in or right out.

Thus, then, the performance in the air. The Vultee is no less interesting from the constructional point of view. It has often been said that all-metal monocoque construction is costly and does not permit of rapid production. Neither can be said of the Vultee. Throughout, there is evidence of the care and thought which has been given both to economical production and to economical output. The fuselage is truly monocoque in that there are no longitudinal members, the skin doing the work of the longerons in more normal designs. In the shops the jigs are set up to secure absolute interchangeability, even to the replacement of one of the plates of Alclad forming the skin of the fuselage. This has actually been proved by replacing a damaged plate with one sent from stock in the factory to an aerodrome where no special skilled labour or equipment was available.

Projected Improvements

The riveted heads all over the exterior of the machine do, of course, detract to some extent from the performance, and it is intended that all riveting shall be replaced by spot welding just as soon as this method of construction is permitted by the authorities. Even now spot welding is used whenever possible, as, for example, for the doors and nearly all the non-stressed parts. The general adoption of this method will make the Vultee the cleanest aircraft imaginable. The wings are built up with the double-skin system common to most metal cantilever jobs where the inner skin is corrugated and the outer skin is flat, the two being riveted together. Alclad sheet is used throughout. With this system the skin takes its share of the stress and forms a rigid, stable structure with the comparatively light rib and spar system built between the top and bottom surfaces.

So much for the Vultee. Turning now to my second machine, we come to something of an entirely different class. This was the Fairchild 24 three-seater cabin

FAIRCHILD TYPE 24 145 h.p. Warner Super Scarab.

WEIGHTS.			
	lb.	kg	
Gross weight ...	2,400	(1,088.6)	
Empty weight ..	1,390	(630.6)	
Pilot and 2 passengers ...	510	(231.3)	
Baggage and accessory allowance ...	237	(107.5)	
Fuel and oil load ...	263	(119.3)	
DIMENSIONS.			
	ft.	in.	m
Span ...	36	4	(11.1)
Length overall ...	23	9	(7.4)
Height overall ...	7	3	(2.2)
PERFORMANCE.			
	m.p.h.	km/h	
Top speed (at 2,150 r.p.m.) ...	133	(214.0)	
Cruising speed (at 1,900 r.p.m.) ...	118	(189.9)	
Landing speed (at sea level) ...	43	(69.2)	
Climb at sea level ...	800 ft. per min.	(4.1 m/sec)	
Fuel capacity ...	33.5 gall.	(152 l)	
Cruising range (at 118 m.p.h. and 7.9 gall./hr.) ...	490 miles	(788.6 km)	
Service ceiling ...	19,000 ft.	(5,791.2 m)	
Climb to 10,000 ft. (3,048 m) (from sea level) ...	20 min.		

machine with the 145 h.p. Warner Super-Scarab engine. Here we have something which is virtually the American answer to our own Leopard Moth class of machine. I was naturally somewhat prejudiced against it at the start in view of the large horse-power and the fuel consumption, but after flying it I must admit that, from a private owner's point of view, it was one of the most fascinating aeroplanes I have ever been in. It seemed quite impossible inadvertently to do anything wrong. By that I mean that no matter in how slovenly a manner I made turns, or how I stalled the machine, or used the controls in a foolish, coarse manner, nothing serious happened or even looked like happening. The machine would, to all intents and purposes, fly itself "hands and feet off," and for all normal flying it did not matter whether you flew either with the stick or with the rudder alone, provided you had trimmed-up fairly carefully.

Being a high-wing monoplane design, the Fairchild naturally led me to expect a fairly high degree of pendulum stability, but I was not quite so prepared to find the aerodynamic stability in all planes so pronounced. It was a real pleasure to have a machine in which one could "let go" and turn round to talk to one's passenger or reach for a sandwich without feeling that at any second it would be necessary to grip the controls and pull out of a steep diving turn, or something equally alarming. It would be difficult to imagine a machine more suitable for the American pilot who wants to fly with comfort in any weather and to visit any class of aerodrome.

From an inside point of view this little Fairchild is admirable. The two front seats are arranged side by side, with full dual control, and upon the instrument panel are all the essential instruments, although the layout in this respect is not so lavish as that of many other American machines. The outlook, however, is good, with deep windows along each side, and the seating is comfortable. The third passenger is placed behind the other two, leaving a space at the side for luggage. Actually, something over 200 lb. of luggage can be carried, as well as three passengers and enough fuel and oil for 490 miles.

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in the list.

Oct. 12-28. International Aircraft Exhibition, Milan.

Oct. 21. R.Ae.S. Lecture: "Piloting Commercial Aircraft," by Maj. H. G. Brackley, 6 p.m., Institution of Electrical Engineers.

Nov. 4. R.Ae.S. Lecture: "The Prevention of Ice Accretion," by B. Lockspeiser, 6 p.m., Institution of Electrical Engineers.

Nov. 18. R.Ae.S. Lecture: "Cooling Problems, with Particular Reference to the Work of the 24-ft. R.A.F. Tunnel," by Dr. G. P. Douglas, 6 p.m., Institution of Electrical Engineers.

Nov. 29. Yorkshire Aeroplane Club. Annual Ball, Hotel Majestic, Harrogate.

Dec. 2. R.Ae.S. Lecture: "Undercarriage Design," by G. H. Dowty, 6 p.m., Institution of Electrical Engineers.

Dec. 6. Hampshire Aeroplane Club: Tenth Annual Dinner and Dance, South Western Hotel, Southampton.

Dec. 16. R.Ae.S. Lecture: "Wireless and Its Application to Commercial Aviation," by Capt. J. M. Furnival, 6 p.m., Institution of Electrical Engineers.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS

STAFF COLLEGE, QUETTA

The undermentioned officer has completed satisfactorily a course at the Staff College, Quetta, which terminated on July 11, 1935: Sqn. Ldr. P. F. Fullard, D.S.O., M.C., A.F.C., *p.s.a.*

PROMOTION EXAMINATIONS

Promotion examinations "B," "C," "E" and "F" will be held on March 10, 11, 12 and 13, 1936.

TRANSFER OF OFFICERS TO THE RESERVE

The undermentioned short service and medium service officers become due in February-March, 1936, for transfer to the reserve on completing their period of service on the active list:—

General Duties Branch

Flight Lieutenants:—Edward George Honeywood Russell-Stracey and Patrick Vaughan Williams.

Flying Officers:—Maurice Henry Kelly, Rupert Vallings Bucknall, William George Allen Coulson, Arthur Philip Glenny, William Halmshaw, Patrick Herbert Maxwell, William Arthur John Satchell, and Reginald Geoffrey Wilde.

Medical Branch

Flight Lieutenants:—William Hall, M.B., Ch.B., M.R.C.S., L.R.C.P., and John McGovern, M.B., B.Ch.

FLYING ACCIDENT

The Air Ministry regrets to announce that F/O. William Daniel Dennehy and F/O. Theodore Cecil Sanders, the pilot and passenger of an aircraft of No. 2 Armoured Car Company, Ramleh, Palestine, lost their lives in an accident which occurred at Sarafand on September 26, 1935.

AIR FORCE ARTISTS' ASSOCIATION

The second exhibition of the Air Force Artists' Association will be held in the North Court of the Victoria and Albert Museum from October 15 to October 26, both dates inclusive, by kind permission of the director of the museum. The exhibition will be opened by the Right Hon. Sir Philip Cunliffe-Lister, G.B.E., M.C., M.P., at noon on October 15, which day will be reserved for the private view.

R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee of the Royal Air Force Benevolent Fund was held at 7, Idlesleigh House, Caxton Street, London, on Tuesday, September 24. Mr. W. S. Field was in the chair, and other members of the Committee present were Air Comdre. B. C. H. Drew, C.M.G., C.B.E., and Wing Cdr. H. P. Lale, D.S.O., D.F.C. The Committee considered a number of cases and made grants to the amount of £299 7s. 7d. The next meeting, to be held at the offices of the Fund, was fixed for Tuesday, October 8, at 2.30 p.m.

ROYAL AIR FORCE GAZETTE

London Gazette, September 25, 1935

General Duties Branch

The following Flight Lieutenants are granted permanent commissions in this rank (September 25):—G. F. Alexander, M. Q. Candler, R. P. Cauthery, B. N. Matson, H. L. Messiter, J. T. Mynors.

The following Flying Officers are granted permanent commissions in this rank (September 12):—G. R. Brice, P. J. Polglase, J. A. Tester.

F/O. W. F. Pharazyn is granted a permanent commission in that rank (September 25):—J. Edwardes is granted a short service commission as Pilot Officer on probation with effect from and with seniority of September 6.

The following Pilot Officers on probation are confirmed in rank (March 16):—R. B. Middleton, J. A. Sutherland.

The following Flying Officers are promoted to the rank of Flight Lieutenant (August 21):—R. C. H. Crosthwaite, H. I. Dabinett.

The following Pilot Officers are promoted to the rank of Flying



LEARNING AT LEUCHARS: A Hawker Nimrod about to be "fired" during catapault training at Leuchars.

NEW YORKSHIRE AERODROMES

Farmers at Leconfield, near Beverley, Yorkshire, whose land is to be acquired by the Air Ministry for the purposes of an aerodrome, have been informed by the Ministry that possession of the land, totalling 400 acres, may be required at an early date. It is expected that the establishment of the Leconfield aerodrome will mean the drafting of 1,000 men and 75 machines into the district. The aerodrome, which will be only ten miles from the projected air base at Driffield, will form one of a semi-circular shield of aerodromes, stretching from Thirsk in the north to Finningley in the south. Negotiations for the purchase of the site of the projected R.A.F. aerodrome at Thirsk were completed a week or two ago.

Officer:—T. B. Morton (July 9); F. B. Chapman (August 16); J. B. Ussher (August 27); J. C. Northey (September 3).

Wing Cdr. J. O. Archer, C.B.E., is placed on the retired list (September 22); F/O. M. R. D. Trewby is transferred to the Reserve class A (September 14); F/O. J. G. B. O'Hagan is transferred to the Stores Branch on probation (September 5). The short-service commission of Acting Pilot Officer on probation N. G. Kendrick is terminated on cessation of duty (August 19).

Accountant Branch

The following are granted permanent commissions as Pilot Officers on probation with effect from and with seniority of September 16:—P. H. Roscoe, W. G. Thorn, C. W. S. Jones.

Medical Branch

The following are granted short-service commissions as Flying Officers on probation for three years on the active list with effect from September 2 and with seniority of the dates stated:—H. E. Bellringer, M.B., Ch.B.; C. M. Carlyle-Gall, M.R.C.S., L.R.C.P.;

T. J. M. Gregg, M.B., B.Ch.; R. S. B. McClean, M.B., Ch.B.; R. S. Peill, M.B., Ch.B.; R. L. Soper, M.R.C.S., L.R.C.P. (September 2, 1934); W. J. L. Dean, M.B., Ch.B.; L. N. Trethowan, M.R.C.S., L.R.C.P. (December 2, 1934); J. B. Wallace, M.B., Ch.B. (March 2); A. S. Amsden, M.R.C.S., L.R.C.P. (March 16); A. B. Marshall, M.R.C.S., L.R.C.P. (May 25); J. P. Carlile, L.R.C.P. and S., M.B., B.S. (September 2).

S. R. C. Nelson, M.D., is granted a short-service commission as a Flying Officer on probation for a period of three years on the active list with effect from and with seniority of August 20; Flt. Lt. J. Magner, M.D., B.Ch., is promoted to the rank of Squadron Leader (September 6).

Dental Branch

D. P. Boyle, L.D.S., is granted a non-permanent commission as a Flying Officer with effect from September 2.

Memorandum

The permission granted to Lt. K. D. Campbell to retain his rank is withdrawn on his enlistment into the Royal Air Force (August 19).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

E. H. Allott is granted a commission as Flying Officer in class A

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain.—R. Collishaw, D.S.O., O.B.E., D.S.C., D.F.C., to R.A.F. Station, Upper Heyford, 31.8.35; to command vice Group Capt. R. B. Maycock, O.B.E.

Squadron Leaders.—R. J. M. de St. Leger, to No. 22 (B) Squadron, Donibristle, 12.9.35; to command vice Sqn. Ldr. T. A. Warne-Browne, D.S.C. K. E. Ward, to No. 10 (B) Squadron, Boscombe Down, 14.9.35; for flying duties vice Wing Cdr. R. E. G. Fulljames, M.C. D. F. Lucking, to No. 9 (B) Squadron, Boscombe Down; for flying duties vice Sqn. Ldr. C. S. Richardson, M.B.E., 19.9.35.

Flight Lieutenants.—W. C. Cooper, to Headquarters, Royal Air Force, Iraq, Hinaidi, 30.8.35. R. F. Shenton, to No. 2 Armoured Car Company, Ramleh, Palestine, 14.9.35. E. J. P. Davy, to Record Office, Ruislip, 23.9.35. A. J. Elliott, to Signals Branch, Department of C.A.S., Air Ministry, 23.9.35. G. Farnhill, to No. 12 (B) Squadron, Andover, 23.9.35. F. C. Rowland, to Home Aircraft Depot, Heald, 24.9.35. H. R. Bardon, to No. 35 (B) Squadron, Bircham Newton, 21.9.35. B. D. Nicholas, to No. 3 (F) Squadron, Whyteleafe, 20.9.35. M. D. Ommanney, to No. 33 (B) Squadron, Upper Heyford, 21.9.35.

Flying Officers.—P. H. Agard-Butler, to No. 822 (F.S.R.) Squadron, 10.9.35. J. A. S. Brown, to No. 811 (F.T.B.) Squadron, 17.9.35. J. R. A. Peel, to No. 601 (County of London) (B) Squadron, Hendon, 21.9.35. R. C. H. Crosthwaite, to R.A.F. Station, Gosport, 11.9.35. W. F. C. Hobson, to No. 1 Air Defence Group Headquarters, 9.9.35. W. L. Stedman, to No. 17 (F) Squadron, Kenley, 17.9.35.

Pilot Officers.—E. U. G. Solbé, to No. 820 (F.S.R.) Squadron, 11.9.35. G. F. Chater, to No. 23 (F) Squadron, Biggin Hill, 16.9.35. H. Georgeson, to No. 23 (F) Squadron, Biggin Hill, 16.9.35. E. K. Piercy, to No. 23 (F) Squadron, Biggin Hill, 16.9.35. W. F. Barton, to No. 84 (B) Squadron, Shaibah, Iraq, 30.8.35. K. S. Batchelor, to No. 84 (B) Squadron, Shaibah, Iraq, 30.8.35. R. E. Burns, to No. 6 (B) Squadron, Ismailia, Egypt, 24.8.35. R. M. Fenwick-Wilson, to No. 14 (B) Squadron, Amman, Transjordan, 24.8.35. G. M. Fidler, to No. 45 (B) Squadron, Helwan, Egypt, 24.8.35. C. Fothergill, to No. 70 (B.T.) Squadron, Hinaidi, Iraq, 30.8.35. W. I. Scott, to No. 30 (B) Squadron, Mosul, Iraq, 30.8.35. J. Edwardes,

(August 30); A. D. Macleod is granted a commission as Pilot Officer in class A on resigning his commission in the Auxiliary Air Force (September 1); G. M. Trundle is granted a commission as Flying Officer in class C (August 30); P/O. E. L. Gosling is confirmed in rank (September 10); Flt. Lt. C. K. Turner Hughes is transferred from class A to class C (September 18).

The following Flying Officers are transferred from class A to class C on the dates stated:—L. E. B. Stonhill (March 8); L. G. A. Kirchner (September 8).

F/O. G. U. Hayns is transferred from class AA(ii) to class C (July 24).

SPECIAL RESERVE

General Duties Branch

The following Pilot Officers are promoted to the rank of Flying Officer (May 19):—B. G. Corry, R. T. Corry, M. J. C. Stanley.

AUXILIARY AIR FORCE

General Duties Branch

No. 600 (CITY OF LONDON) (FIGHTER) SQUADRON.—P/O. A. D. Macleod relinquishes his commission on appointment to a commission in the Reserve of Air Force Officers (September 1).

to No. 10 (B) Squadron, Boscombe Down, 6.9.35; on appointment to a Short Service Commission.

Acting Pilot Officers.—W. E. Casley, to No. 7 (B) Squadron, Worthy Down, 14.9.35. J. E. Pelly Fry, to No. 7 (B) Squadron, Worthy Down, 14.9.35. J. Fulton, to No. 10 (B) Squadron, Boscombe Down, 3.9.35. C. R. Hart, to No. 10 (B) Squadron, Boscombe Down, 3.9.35. J. A. Tinne, to No. 7 (B) Squadron, Worthy Down, 3.9.35.

Stores Branch

Flight Lieutenants.—M. W. Keey, to No. 3 (F) Squadron, Whyteleafe, 20.9.35. M. S. Shapcott, to No. 101 (B) Squadron, Bicester, 25.9.35.

Flying Officers.—D. F. Syder, to R.A.F. Depot, Middle East, Aboukir, 25.8.35. The following Flying Officers are Posted to School of Store Accounting and Storekeeping, Cranwell, on 5.9.35, on appointment to Permanent Commissions: B. H. Alder, A. C. Dibben, L. Doyle, and E. H. Free.

Pilot Officer.—K. T. Nicklin, to School of Store Accounting and Storekeeping, Cranwell; on appointment to a permanent commission as Pilot Officer on probation, 6.9.35.

Accountant Branch

Wing Commander.—P. J. Wiseman, to Headquarters, R.A.F., Halton; for duty as Command Accountant vice Group Capt. C. G. Murray, O.B.E., 23.9.35.

Flying Officer.—F. W. Judge, to No. 101 (B) Squadron, Bicester, 17.9.35.

Pilot Officers.—C. W. S. Jones, P. H. Roscoe, W. G. Thorne, to Headquarters Royal Air Force, Cranwell, on appointment to Permanent Commissions as Pilot Officers on probation, 16.9.35.

Medical Branch

Flight Lieutenant.—A. E. Vawser, to R.A.F. Depot, Uxbridge, 17.9.35.

Dental Branch

Wing Commander.—L. Somerville-Woodiwi, to D.M.S. Department of A.M.P., Air Ministry; for Staff duties as Chief Dental Officer, vice Group Capt. C. L. Colbran, O.B.E., 26.9.35.

DEATH OF A.V.-M. SIR VYELL VYVYAN

IT is with deep regret that *Flight* records the death last Monday, after a few weeks' illness, of Air Vice-Marshal Sir Vyell Vyvyan. Sir Vyell will be remembered for his great faith in Empire route development, as a Government Director of Imperial Airways, and for a distinguished career in the Royal Air Force and, previous to that, in the Royal Navy.

Born in 1875, he left the *Britannia* as a midshipman in 1891. He was thereafter appointed to various ships and took part in the Benin Expedition of 1897. In 1906 he was promoted to Commander, and in 1913 was appointed Assistant to the Chief of War Staff, Admiralty.

He served afloat during the War, and, as a Captain, R.N., was appointed Beach Master in Gallipoli in 1915, receiving the D.S.O. for his services in that famous campaign. In 1916 he was appointed to the Air Depart-



Sir Vyell Vyvyan—a photograph taken at the time of his flight to India when Imperial Airways inaugurated the mail service. (*Flight* photograph.)

ment at the Admiralty as assistant to Sir Murray Sueter, and on the establishment of the R.A.F. in 1918 was regrated as Colonel and Temporary Brigadier General. In 1919, as an Air Vice-Marshal, he was appointed to the command of the newly-created Coastal Area. This post he held for five years, retiring from the Service on September 1, 1925.

He was soon afterwards appointed one of the Government Directors of Imperial Airways, and in April, 1929, flew with the first India air mail, which made the out-and-home journey in fifteen days. In January, 1932, Sir Vyell, in company with other officials and Lady Vyell, opened the Cape Town weekly service by flying as a passenger in the machine.

It is announced that the funeral will take place at Golders Green at 12.30 p.m. to-day, Thursday.

The CASE for HEAVY OIL

Mr. H. R. Ricardo, the Well-known Engine Designer, Pleads for the Compression-ignition Unit on the Score of Safety

SOME five or six years ago there appeared a wave of enthusiasm in favour of heavy-oil compression-ignition engines for aircraft. Even in quite responsible quarters it was then freely prophesied that, before ten years were out, the aircraft petrol engine would have become almost extinct.

At that time I felt constrained to point out in articles and lectures that the case for the compression-ignition engine was being exaggerated, and that there was a real danger of its being killed by over-praise; I tried then to emphasise that it was a healthy child, but not an infant prodigy. I pointed out also that the petrol engine had, in my opinion, by no means reached its zenith and that, in fact, for military purposes there was far more scope for improvement in the direction both of specific power output and of fuel economy in the petrol engine of five years ago than in the four-cycle Diesel engine of the same date. To-day it seems that my forebodings have been realised: the pendulum has swung and the four-cycle C.I. aircraft engine has dropped almost out of the picture, though its development and progress in other spheres has been almost startling in its rapidity.

Military Influence

The progressive improvement in the fuel for petrol engines has resulted, as we all foresaw, in a great improvement in specific power and in fuel economy, the former due to the use of supercharging, and the latter to higher ratios of compression, both of which have been made possible by improvement in the anti-detonating property of aircraft petrol, with the result that the four-cycle C.I. engine has been left behind in the race for military aircraft. But must we always consider aircraft only from the purely military point of view? Between military and civil conditions there is a great and growing gulf fixed; the former requires performance above all else, for safety from fire risk is of little account if it means being out-

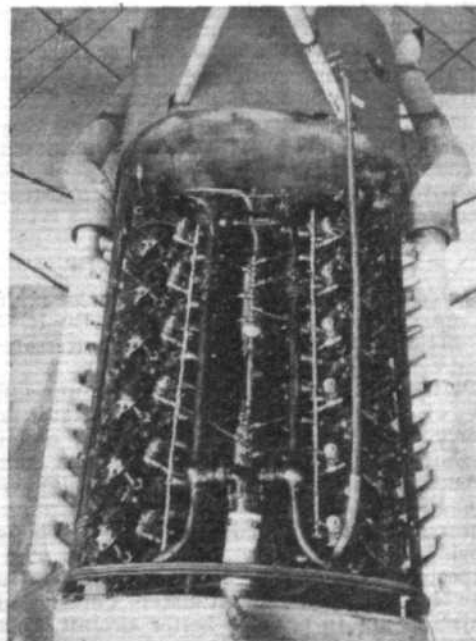
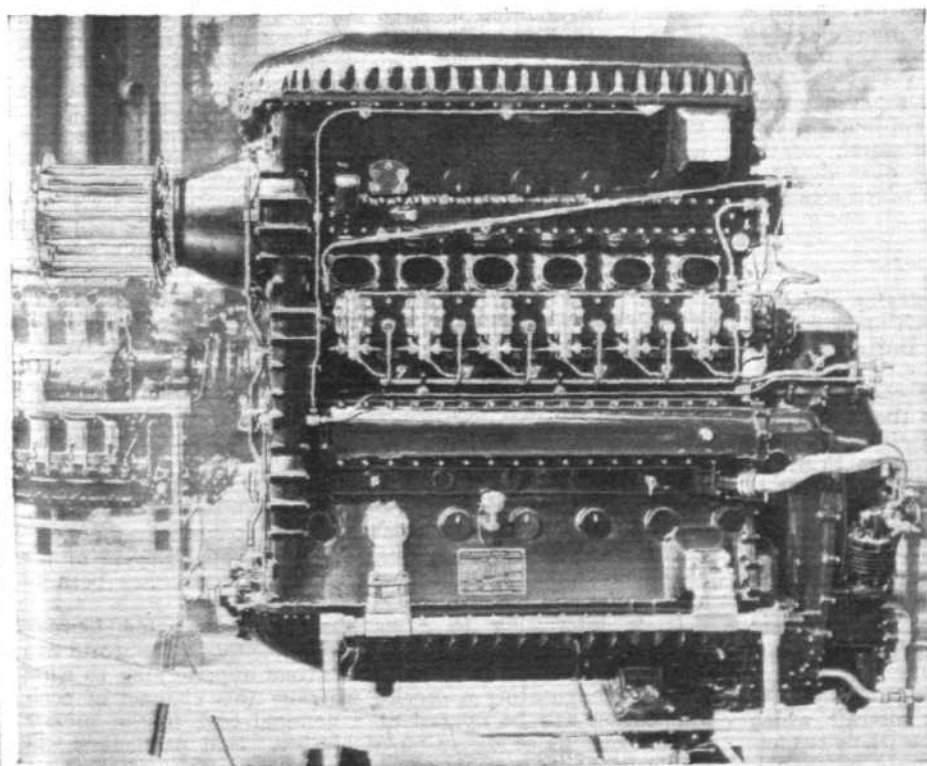
manoeuvred and shot down by the enemy, but neither manoeuvrability, nor rapidity of climb, nor vulnerability are of such vital importance to civil aviation. For civil aviation we require rather, I think, freedom from fire risk, freedom from petty breakdowns (which may involve a forced landing, or even a crash), freedom from interference with wireless communication and economy in fuel cost. All these the compression-ignition engine can give us, and that almost at once, for its development in other spheres has reached such a stage that it could be adapted to aviation with very little difficulty.

Because it cannot consume the whole of the oxygen content of the air in the cylinder, and because it operates at a very much higher compression, the C.I. engine must always be somewhat heavier than its counterpart using petrol, but not a great deal heavier, while, owing both to the high flashpoint of the fuel, to the very much lower temperature of the exhaust, and to the absence of electric ignition, it is almost immune from any risk of fire in a crash. Again, the absence of electric ignition or carburetors increases considerably its immunity from petty breakdowns.

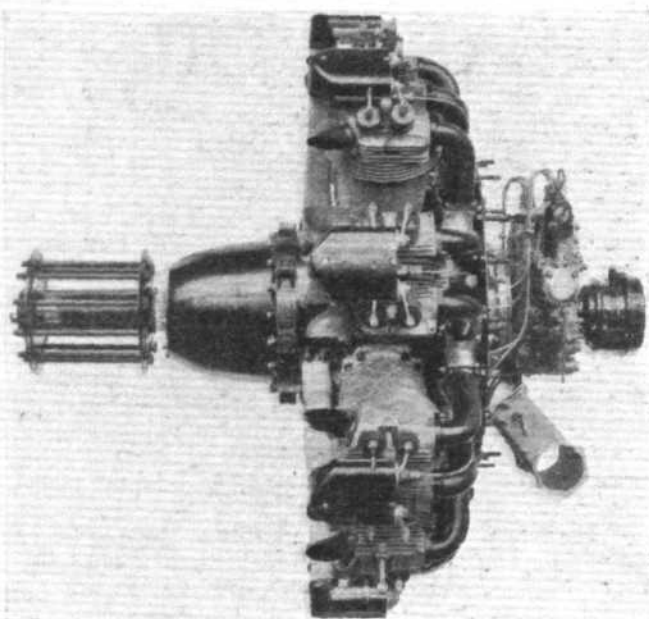
Let us review the progress, during the last few years, of the competition between the petrol and the C.I. engine in heavy road vehicles, where the advantages of the latter are much less apparent. We must admit that, in this sphere, engine weight is not of such vital importance, but, on the other hand, neither is the fire risk, while the advantage of the C.I. engine in the way of cost of fuel has been handicapped by the imposition of a tax on heavy oil for road vehicles equal to that on petrol, a handicap which does not apply in the case of aviation engines. In spite of these disadvantages the C.I. engine has, in fact, almost completely ousted the petrol engine for heavy road transport, and that in an incredibly short space of time.

To-day the position is as follows:—

There are now approximately 10,000 C.I. engines operat-



The 720 h.p. Napier Culverin C.I. engine (left) has six cylinders with two vertically-opposed pistons in each. The Rolls-Royce Condor C.I. unit of 1932 (above) was a conversion from a petrol engine.



This Bristol Phoenix C.I. radial took a Wapiti up to 28,000 ft., establishing a record for engines of its class.

ing on the roads of Great Britain and many of the largest manufacturers of commercial vehicles have abandoned the building of petrol engines altogether. A vast fund of operating experience is already available, and from this it emerges:

(1) That the operating cost of the C.I. engine, despite a tax of 8d. a gallon on the fuel, is substantially less than that of the petrol engine.

(2) The statistics of the London Transport Board, who have now nearly one thousand C.I.-engined buses in operation, show that the mileage covered between involuntary stops (involving transference of passengers in the case of a bus but possibly a crash in that of aircraft) is more than twice as great in the case of

C.I. as in that of petrol engines, due to the absence of electric ignition or carburettors.

(3) Though there is no large difference between the best full-load test bench consumption of C.I. and petrol engines, yet the former show, in actual fleet service over long periods, 70 per cent. greater mileage per gallon, due to the fact that the cycle is one which insists always on the use of a weak mixture well below the chemically correct proportions, and it is wholly impossible to run over-rich.

(4) All operators appreciate the greater responsiveness of the C.I. engine; it cannot be stalled by opening up suddenly from idling; its acceleration is much better and it requires no preliminary warming up.

Against the C.I. engine we have to-day only its greater specific weight, which may now be of the order of 33 per cent. as compared with similar petrol engines having a similar margin of safety, but even this is offset, in part at all events, by the considerably smaller cooling surface required and by the reduction in the weight of fuel carried for a given distance.

It seems almost ironical that while, despite the imposition of a heavy tax, the C.I. engine is rapidly hounding the petrol engine from the bus and lorry, where the fire risk is trivial and reliability, etc., are of far less account, its use in civil aviation has never seriously been attempted, though these factors are of infinitely greater importance, for in this latter application they affect human life as well as a balance-sheet.

With the data available to-day from road transport experience, there should be little or no difficulty in producing a C.I. engine which would, I believe, meet all the needs of civil aviation, increase our reliability factor and save us from the ever-present horror of fire.

The fire risk is always a difficult factor to argue because it cannot be assessed in any absolute or even relative terms. We are told by some authorities that it does not act as a deterrent to would-be passengers, and this, indeed, may be true, for the public, as a whole, abhors discomfort but takes little heed of danger. This, however, is no argument for allowing them wantonly to run the risk of the most horrible fate imaginable.

Super Loudspeaking

EXPERIMENTS have been recently carried out by a Leicester firm of wireless makers at the Municipal Airport with a remarkable loudspeaker which is said to have a range of four miles. The sound could be heard by motorists two miles away above the noise of their own engines, the distance naturally varying with the age of the car! People in some parts of Leicester could also hear the voice of the announcer.

Direct communication with aircraft by means of loudspeakers has, of course, been used before. During the search for the kidnapped Lindbergh baby, aeroplanes flying over deserted areas were equipped with loudspeakers through which messages were sent to outposts below.

Book Review

Aircraft Manufacture: A Description of the Industry and Proposals for its Socialisation. By R. McKinnon Wood. (Published by the New Fabian Research Bureau and by Victor Gollancz, Ltd., 6d. net.)

THIS is a slight pamphlet which urges the nationalisation of, primarily, the supply of aircraft for the Royal Air Force, and, secondarily, of the supply of civil aircraft. The author, Mr. McKinnon Wood, was for many years Principal Scientific Officer in charge of the Aerodynamics Department of the Royal Aircraft Establishment, Farnborough, and so he knows the aircraft industry well. The objects which he obviously has in view in urging this step are those to be expected from a New Fabian Research Bureau publication, namely, Socialism and ultimately universal disarmament. The object is not to produce better aircraft, though the argument is put forward that large concerns have more resources and that the State has most resources of all.

Socialists will doubtless delight in this little pamphlet. It is the production of better and even better aircraft which interests *Flight*, and from that point of view the whole suggestion must be condemned as retrograde and utterly untenable.

Lt. Cdr. C. N. Colson

SO successful have been the different types of Miles aeroplanes produced by Phillips and Powis, of Reading, that orders have followed in large numbers upon the introduction of each new type. Production to keep pace with orders has become quite a problem, and the recent success in the King's Cup race has given a further fillip to an already flourishing business. Mr. Charles Powis recently offered Lt. Cdr. C. N. Colson, R.N. (Retired), the post of works manager; the offer was accepted, and Lt. Cdr. Colson took over his new duties on Monday last.

His War service as a submarine officer involved considerable periods of flying duties, in seaplanes, flying boats and kite balloons. After the War, he continued his flying while managing an oil well in Yugoslavia.

Lt. Cdr. Colson had been Assistant Editor of *Flight* for some six years, and his wide aircraft experience included a previous five-year period with the Westland Aircraft Works at Yeovil, during which time he obtained several ground engineers' licences. His colleagues on *Flight* wish him every success in his new post.

For Wireless Listeners

AMONG the millions of radio-listeners there are undoubtedly many thousands who own sets of which they desire to dispose in order to change over to something newer.

There are also many thousands of potential buyers of the no-longer-wanted sets. The trouble, hitherto, has been to bring seller and buyer together.

It is interesting to know that our associated journal, *The Wireless World*, the oldest radio weekly in the world and the recognised authority on all matters appertaining to wireless, is inaugurating a service whereby this channel of communication can be opened at a nominal cost to the private owner desirous of disposing of his set. Full particulars will be given in *The Wireless World* to-morrow, Friday October 4.



Private Flying

Topics of the Day

Competency Certificates

ONE or two amateur pilots, who do quite a lot of flying, yet who cannot afford to buy their own machines, have complained recently of the difficulties they have encountered in hiring machines in different parts of the country. At each club, they explain, it is necessary to go through the business of being "passed off" in the various categories before being allowed to borrow a machine for a long cross-country flight.

Naturally enough, every club is anxious that its insurance rates should be as low as possible and that none of its machines should be put out of action at any times save those for normal overhaul. Furthermore, an insurance policy usually stipulates that the machines must only be flown for different purposes after the instructors have satisfied themselves that the pilots are competent. Mere hourage is not enough to guarantee the fact that a particular stranger is a safe and skilful pilot.

Nevertheless, it should be possible to arrange that some form of certificate of general competency is obtainable from any one qualified instructor so that, on visiting and becoming a temporary member of another club, its production and the sight of a log book and certificate would give an itinerant amateur the right to hire particular machines without preliminary dual instruction.

Unnecessary Instruction

DURING the past six years I have been a member, or temporary member, of more than half a dozen clubs, and at each it has been necessary to go up with an instructor on every one of the different types used by the particular club. In all, and at clubs only, I have been passed out three or four times by different instructors on eight or ten different types and sub-types. Quite a number of other people have probably exceeded these figures by a handsome margin.

A glance at my log book shows that I have spent about five good flying hours in unnecessary checks on identical machines and in repetition checks on such things as forced landings and minor aerobatics. Every minute of the five hours has been valuable—one always learns something new, particularly since instruction varies within quite wide limits—but many of us would do much more flying at different clubs if it was not for the painful thought that we should have to spend ten minutes or so with an instructor in each of a series of all-too-familiar types. "Country membership" fees are usually merely nominal, and it is always good fun and good experience to fly round new stretches of country, as well as to obtain some more practice on comparatively unfamiliar types.

Any little change that is likely to encourage amateur pilots to do more flying is good for the club movement, even though only one club may be able to obtain the grant for each pilot's licence renewal.

A Cross-country Special

SPEAKING of encouragement, it might be a good thing if every club of any size kept one particular machine for long-distance cross-country use. Although it is usually possible to obtain an aeroplane for a whole day at flying hour rates during the week, the pressure of instruction on Saturday and Sunday prevents such use during the week-end. Yet it is only during the week-end that the majority of amateurs can spare the time for air travelling.

If one machine was put aside it might still be necessary to book it a fortnight ahead, but many members who would otherwise remain on the ground would put in good and useful hours.

However, at least one important club is finding it impossible to cope with all the people who wish to obtain their "A" licences and, preliminary training being the most profitable from the club's point of view, other flying must take a very second place. At this particular club new members need to book week-end instructional half-hours about a fortnight previously.

All of which shows that enthusiasm is rising and that, at the same time, the number of prospective private owners is also increasing. New pilots must, however, be continually encouraged to carry on with their flying, and, to this end, instructors and secretaries should use all their ingenuity in inventing new interests for bored novices.

Soaring Purists

MANY sailplane pilots and nearly all keen yachtsmen have one thing in common. Each despises the owner or user of the mundane power craft, yet each is often helpless without its assistance. In the same category are the various species of "simple lifers," who affect a deep loathing for all modern inventions, yet who depend entirely on vile commerce and such inventions for their very existence in a tolerant community. We would all live the simple life if we could prevail on persons or invent machines to carry out all necessary social services.

It is difficult to see why ardent sailplane pilots should object so heartily to the words "motor-assisted glider." If "sailplane" is substituted for "glider," and if such a machine can be made as a tolerably efficient flying machine as well as a very efficient sailplane, the business of soaring will be greatly simplified. Instead of motoring many miles to a hill where up-currents can be found and of waiting many days for a suitable wind, it would be possible for the pilot to soar from a nearby aerodrome.

The technical difficulties involved in the development of such a device are probably immense—though one has been made and has at least left the ground—and the possibility that the pilot would lose his cloud lift while "winding in his motor assistance" may be considerable. Such difficulties, however, do not justify an airy dismissal of the idea as an idea.

INDICATOR

Private Flying**FROM the CLUBS***Events and Activity at the Clubs and Schools***LIVERPOOL**

Gales made flying impossible last week-end and flying times for the week totalled only 30 hr. 55 min. With effect from Sunday, October 6, flying will begin daily at 10.30 a.m. both at Speke and Hooton.

CASTLE BROMWICH

During the two weeks ending September 26, 18 hr. 45 min. dual and 12 hr. 15 min. solo flying were logged.

New members include Messrs. R. Beard, E. F. Wild and C. N. Green, in the flying category, and Messrs. E. A. Mellors, I. S. Davies and C. F. Nicholls have become ordinary members.

BROOKLANDS

A Hornet Moth, which was being delivered to Brooklands Air Taxi, was demonstrated at the aerodrome last week.

Mr. Rae has been drafted up to Sywell. New members include Messrs. R. D. Aeland and Tom Streichenberg, and Messrs. Ward and Barron have gone solo. Mr. Melrose dropped in last week with his Gull.

HANWORTH

The new hangar now houses Mr. Melrose's Gull, the Martlett of Mr. Maxwell and Capt. the Hon. F. E. Guest's B.A. Swallow Mark II.

Mr. Donada, piloted by Mr. Easdown, has arrived back from Switzerland after an extensive tour. Messrs. Vickers and Kenyon have gone solo. In spite of adverse weather conditions on some days, 40 hr. 25 min. flying was recorded.

CINQUE PORTS

The main event of last week—the general exodus of machines for the opening of the South Coast Flying Club at Shoreham—has been fully recorded in *Flight*. The weather for the return trip to Lymington was by no means favourable and its persistence has kept flying hours down to thirty-five.

A B.A. Swallow was demonstrated for the benefit of one of the members. Lord Kildare called in and took a Puss Moth over to Ireland for a week-end. Mr. Tom Adam went northward to his home in Aberdeenshire and Mr. Guy Prendergast returned to Lymington from Dyce.

The Army manoeuvres having ended, officers of the Royal Berkshire Regiment have started flying again. Miss Margaret Clingan and Mr. Johnson have become members. Mr. Mason—an ex-R.A.F. member—is building a "Pou du Ciel."

DUBLIN

The weather prohibited machines of Dublin Air Ferries, Ltd., flying more than 60 hr. 45 min. in the past fortnight. In all probability there will be more flying next month as two of the machines are now going down for their C. of A's.

There have been several interesting charter jobs, five of them in connection with the landing of Lt. Waitcus, who flew the Atlantic in a Lockheed Vega, at Ballinrobe, Co. Mayo. In each case the machines landed with reporters and cinematographers on the race-course three miles away. The damaged Vega has been taken to the I.F.S. Air Force Headquarters. Lt. Waitcus, it is not generally known, holds an American ground engineer's licence for all types of machines and has designed two racing aeroplanes.

Mr. Morough-Ryan has gone solo with the Dublin Aero Club, and the following members have taken their "A" licences: Messrs. L. U. Smith, M. Brady, C. Scott, B. Regan and Miss Beatty.

BENGAL

Flying returns for August showed 105 hr. 5 min. During that month three members started taking dual instruction and Mr. R. Pax went solo. There are now 140 Indian and 118 European members.

RANGOON

Fifty hours, twenty minutes flying was done by machines of the Rangoon Flying School during August. Four new pupils joined, and two others completed tests for the Indian "A" licence. Mr. A. J. Pigau is taking a blind flying course.

YORKSHIRE

Stormy weather has reduced flying time for the past week to 13 hr. 45 min. Flying returns for August showed 232 hr. 10 min.

The D.H. Hornet Moth created a favourable impression during a demonstration at Yeadon on September 20.

CAMBRIDGE

Machines of Marshall's Flying School and the Cambridge Aero Club, Ltd., put in 27 hr. flying last week despite the handicap of the weather. A Gipsy Moth, G-ABPJ, has been added to the fleet of training machines, bringing up the total number of school and club aircraft to seven.

REDHILL

Five pupils are taking blind flying instruction and there are eight new members of the Club. Mr. W. G. Stewart Menteth and Mr. H. Hickman passed their "A" licence tests last week, and Mr. O. Pritchard passed those for his "B" licence, including the night flight.

Flying time last week totalled 41 hr. 25 min.

READING

The weather has been very unfavourable to flying for several days past, but Mr. K. Russell has gone solo.

Mr. C. O. Powis and Flt. Lt. T. Rose left on September 24 for an extended Continental tour in the victorious King's Cup Falcon and a Hawk Trainer.

Mr. C. N. Bishop gave an aerobatic display over the Reading Gymkhana at Earley last Saturday.

LEEMING

High winds prevented flying on several days last week, but Miss Liversidge managed to make a successful first solo.

Mr. D. E. Milson has taken over the duties of instructor during the absence of Commander Croxford. New pupils are Dr. Smith and Messrs. Chown, Barlow and Chisholm. Mr. Curry passed the general flying test for his "B" licence. Flying time for September—up to last Sunday—was 105 hr. 15 min.

HERTS AND ESSEX

The comparatively low total of flying times for the past fortnight (103 hr. 35 min.) resulted from three non-flying days. Messrs. A. Brine, N. F. McLeod, J. E. W. Marten and A. R. Saward have become members, and first solos have been made by Mr. Graham Crump and Miss E. M. Stewart. Mr. M. Hansen completed his "A" licence tests.

The competition for the "Janet Lady Brickwood" challenge cup will be held on October 6. Competitors will fly over a triangular course with alternative routes home, landing, on their return, from 2,000 ft. without using their engines.



RELIANT: The latest Stinson Reliant photographed outside Rollason's shops at Croydon soon after it had been assembled for Brian Allen Aviation, who are the sole distributors in this country. This new model has pneumatically operated flaps and a Smith v.p. airscrew as well as improved internal fittings. (*Flight* photograph.)

NEWCASTLE-UPON-TYNE

Four "A" licences were obtained by Club members during September, and several first solos were made. Since January 1, no fewer than 1,340 hours have been flown, the figure showing an increase of 270 hours over that for the corresponding period of 1934. During September this year 121 hr. 50 min. flying was logged.

The Club has been closed for dual instruction until October 13, but the clubhouse and aerodrome will be open as usual, and machines will be available for approved "A" licence pilots.

TOLLERTON

Heavy showers and strong winds account for the somewhat small flying return for last week of 16 hr. There are two new associate members, and Mr. A. P. Woodward has enrolled as a flying member. Tollerton's social activities for the winter season are being arranged, and will open with a dance at the clubhouse on October 4. Flying competitions are to be held during the next three week-ends.

NORFOLK AND NORWICH

Last Thursday afternoon, at the invitation of Mr. A. E. Neal, the Norwich Traffic Club held their annual outing at the Club. There was a good gathering of members, who were shown round the premises and hangars by the Chairman, and Mr. M. E. King gave an aerobatic display in his machine. A number of members and their wives also took the opportunity of taking their first-flight with Capt. J. Collier in the Club's Fox Moth.

On Saturday afternoon Mr. S. Stevenson gave a short demonstration to a contingent from the New Costessey Scouts.

Parachutes for Club Pilots

NEW ZEALAND does not altogether abound in forced landing fields, and, since several lives have been lost in various parts of the country, the Wellington Aero Club has decided to equip its machines with G.Q. parachutes.

A Chance for the Adventurous

A WELL-KNOWN long-distance pilot, who is shortly to attempt to break the Cape record with a Miles Falcon, is anxious to obtain the "services" of a passenger of either sex who will be prepared to share the expenses. Anyone interested should write to the Editor of *Flight*, who will forward the letter to the right quarter.

Gliding at the Forum

REMEMBERING all the political and technical problems which might have been discussed, it was rather surprising that the speeches at the Forum Club Aviation Section's dinner to celebrated gliding pilots should have developed into a polite battle between one exponent of pure sailplaning and "the rest." Mrs. Nigel Norman was in the chair as arbitrator or keeper of the peace, and the guns were well loaded.

It all began when Mr. Phillip Wills, as the chief speaker of the evening, took careful aim and fired at everything from the "bedroom to grave" constructors of machines for the quarter-million to those who elect to obtain a profit from the business of aviation. His was one of the most apt and witty pieces of oratory that we have heard for a long time, though it left some of the guests, who had hoped for instruction, rather in the air.

Mr. Robert Kronfeld, on the other hand, speaking well in a language that is not native to him, explained that soaring was not only very good fun but was also extremely useful both to the pilots concerned and to the meteorological people. He referred more briefly to the ultra-light aeroplane, to his own experiences and to the possibility that man-powered aeroplanes might eventually be successful. Other speakers were Mr. Gordon England, Mrs. Patrick Ness, who toasted the guests, Mr. C. G. Grey, who rose at the request of several friendly enemies, and Lord Sempill, who replied for the guests.

A Hornet at Croydon

LAST week Rollason Aircraft Services took delivery of their demonstration Hornet Moth and enlarged their staff by the addition of Mr. "Tommy" Nash, late of Atlantic Coast Air Services, who will help Mr. Willson with the sales and demonstrations. The Hornet is standard save for the use of an Eclipse inertia starter, but will shortly be fitted with Reid and Sigrist blind flying equipment, and has already been to Bristol and elsewhere on demonstration.

Some ten Hornets have been sold by Rollasons already, and ten more have been ordered. Mr. George Eyston, one of the purchasers, wired them from America after his record attacks.

"Home James, and don't spare the Hornet," he said, so presumably he will now be sitting on the doorstep, waiting for delivery. Several interesting engine jobs have been or are being carried out at Croydon, including the overhaul of a Cheetah for Lord Ronaldshay, and a Jupiter VI out of Mr. Lissant Beardmore's Junkers monoplane.

Last week, too, Rollasons assembled Brian Allen's recently ordered Stinson Reliant, which has been bought by Mr. Constant.

Improvements at Carlisle

RAPID strides have recently been made in the improvements to Carlisle aerodrome and in the provision of additional facilities for pilots and passengers flying the Western route to and from Scotland.

A large steel and corrugated iron hangar houses the aircraft of the Border Flying Club and is available for visiting aircraft, with a comfortable all-electric clubhouse and restaurant for visiting pilots and passengers, electric fires and cookers being installed. The aerodrome is in the charge of a control officer, and a qualified ground engineer is available.

The telegraph wires along the boundary running roughly north and south have now been removed, and a clear, easy approach from that direction may now be made. As the prevailing wind is from the west this is perhaps the most important alteration. To assist this approach further the petrol pumps and hut have been moved nearer the hangar, and the present east and west run is 630 yards. Two additional fields are being levelled and will, in due course, be included in the area, so that the east and west run will be more than 750 yards. The lane which used to run along the north edge of the field has been removed and levelled, and the houses and sheds at the western end removed. The trees in the bird sanctuary along the west boundary have been cut down, and the distance between the nearest trees and the boundary is now seventy yards.

Money flares, boundary and obstruction lights will be put out on request. Usually two hours' notice is expected, but they will, of course, be put out at once if required. General weather reports at hourly intervals are available at the clubhouse, while local weather conditions are telegraphed to the Meteorological Section at Manchester. A compass base suitable for small and medium-sized aircraft is provided, and the ground engineer is fully competent to deal with any "swing-ing" work required to be done.

The Border Flying Club is making good progress. It has been in existence now for just over two months, and a second Gipsy II Moth has recently been purchased. Membership, which is increasing weekly, now exceeds seventy.

Carlisle aerodrome is actually two miles north of the city and opposite the junction of the north roads to Edinburgh and Glasgow.



FOR THE RESERVE SCHOOLS: A batch of D.H. Tiger Moths at Hatfield before being delivered. (*Flight* photograph.)

KOOLHOVENS for "ALPAR"

High-wing Monoplanes : Ten Passengers : 152 m.p.h. Cruising With Two Wasp Juniors

THE first of a series of new passenger machines, built for the Swiss Air Transport Company, "Alpar," of Bern, left the Koolhoven works on September 18. Accommodation for eight to ten passengers is provided.

In general layout the F.K.50, as the type is known, is a high-wing cantilever monoplane with two Pratt and Whitney Wasp Junior engines mounted in nacelles on the leading edge of the wing. Provision has been made in the design for the installation of other radials of similar power.

Structurally the wing is entirely of wood. There are two box spars, consisting of silver spruce flanges and webs of birch plywood, carrying plywood ribs. The main portion of the wing is plywood covered, but the aerodynamically balanced ailerons are of duralumin. Flaps run between the ailerons and the fuselage.

Welded steel tubular construction, with fabric covering, is employed for the fuselage. The pilot's cockpit is located forward of the plane of the airscrews and is provided with windows of shatterproof glass, three of which can be opened. In the passenger cabin the windows extend over the whole length of the walls.

For normal air line use eight passengers are carried—six on normal seats and the remaining two on a bench at the rear of the cabin. A passage communicates with the pilot's cabin. Two of the three luggage compartments are in the plane of the airscrews and the other is behind the lavatory. The cabin is warmed by exhaust-heated air, while a ventilation intake located in the nose of the fuselage supplies fresh air to each passenger. For joy-riding and "ferry" work ten seats may be installed, the distance between them, in this case, being 34.6 in.

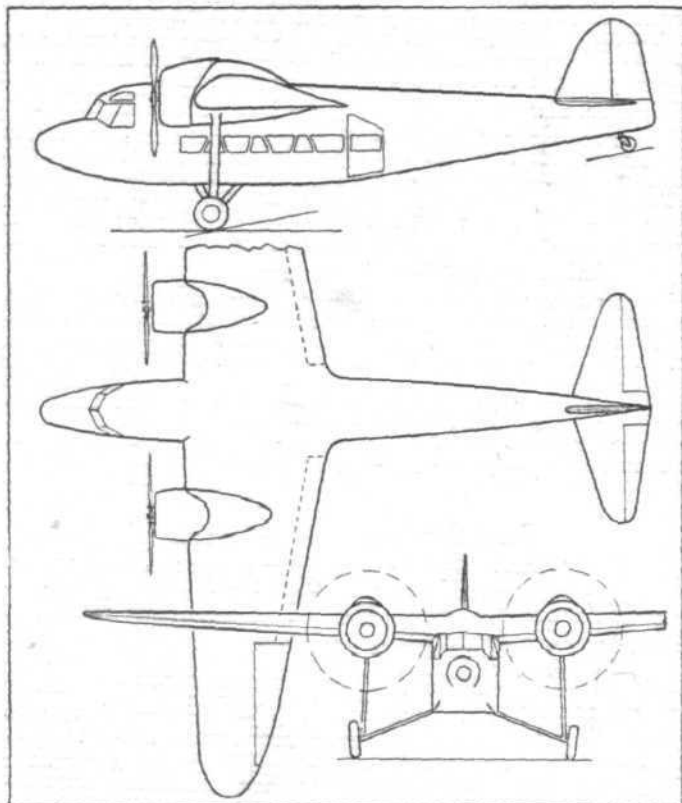
Modern Refinements

Both elevator and rudder are of steel construction with fabric covering, whereas the tailplane and fin are of wood. The rudder is statically balanced and has a trimming "tab" controllable from the cockpit.

Koolhoven oleo shock-absorbers attached to the front spar are employed in the undercarriage, which embodies low-pressure tyres and independently operated brakes. The track is very wide in relation to the span.

The two Wasp Junior nine-cylinder radials are of the TB type giving a maximum output of 406 h.p. at 2,200 r.p.m. They drive Hamilton C.P. airscrews, are attached to interchangeable mountings of welded steel tubing, and have exhausts of stainless steel and Eclipse starters. N.A.C.A. cowlings are fitted, these being of the type which increase in chord as their upper surfaces are approached.

Each engine has its own petrol tank, located between the spars. The petrol is normally supplied to the carburettors by engine-driven pumps, but a hand pump is provided for emergencies.



Perhaps the most striking external features of the new Koolhoven F.K.50 are the cowlings over the Wasp Juniors. They are, supposedly, conducive to a good airflow. The outlook for crew and passengers is exceptionally good.

KOOLHOVEN F.K.50
Twin-engined eight-ten passenger monoplane
Two Pratt and Whitney Wasp Junior TB, 406 h.p. (max.) at 2,200 r.p.m.

DIMENSIONS AND AREAS		
Span	...	59 ft. (18 m.)
Height	...	12 ft. 0 in. (3.7 m.)
Length	...	45 ft. 10 in. (14 m.)
Track	...	16 ft. 4 in. (5 m.)
Wing area	...	484.37 sq. ft. (45 m ² .)
WEIGHTS AND LOADINGS		
Tare weight	...	5,699 lb. (2,585 kg.)
Gross weight	...	9,039 lb. (4,100 kg.)
Wing loading	...	18.63 lb./sq. ft. (91 kg./m ² .)
Power loading	...	11.1 lb./h.p. (5.05 kg./h.p.)
PERFORMANCE		
Maximum speed	...	171 m.p.h. (275 km/hr.)
Cruising speed	...	152 m.p.h. (245 km/hr.)
Stalling speed	...	62 m.p.h. (100 km/hr.)
Initial rate of climb	...	1,270 ft./min. (6.5 m/sec.)
Absolute ceiling	...	19,685 ft. (6,000 m.)
Service ceiling	...	18,044 ft. (5,500 m.)
Ceiling on one engine	...	5,905 ft. (1,800 m.)



Despite its somewhat conservative layout "Alpar's" new Koolhoven is a credit to its constructors—aerodynamically and structurally.

EXHAUST-OPERATED VENTURIS

Ice Formation Avoided : Operation of Gyro Begins Before Aircraft Leaves the Ground

WITH instrument-flying equipment becoming standard on more and more aircraft, the question of drives for gyroscopic instruments assumes increasing importance. Hitherto the most popular form of drive has been the venturi tube, placed outside the fuselage. There are two objections to this arrangement: the suction is insufficient to accelerate the gyros up to proper working speed, so that blind-flying instruments cannot be used during the actual take-off, and the formation of ice on the venturi constitutes a risk of breakdown in conditions when the blind-flying instruments are most wanted.

Some designers, notably in America, have attempted to overcome the difficulties by installing an engine-driven pump and a reservoir. Dr P. Schilovsky, whose name for many years has been associated with gyroscopic turn indicators, has conceived the idea of placing the venturi either actually inside the engine exhaust pipe or just aft of the end of the pipe. The venturi is, of course, made of heat-resisting material.

The exhaust pipe itself forms what is actually the outside cover of a large combined venturi, guiding the stream of gases and increasing the suction capacity of the small chamber within it. This fact also accounts for the small dimensions of the Schilovsky suction device which, it is claimed, produces no appreciable obstruction to the flow of gases. The device may be made of porcelain or, alternatively, of heat-resisting metal, when it has, of course, no soldered parts.

Should alterations in the exhaust pipe be found undesirable, the small chamber may be located outside the orifice of the pipe at a distance of an inch, or more in the case of powerful engines.

Another alternative arrangement entails the placing of the suction chamber round the pipe, suction being produced either through a slot or a series of holes.

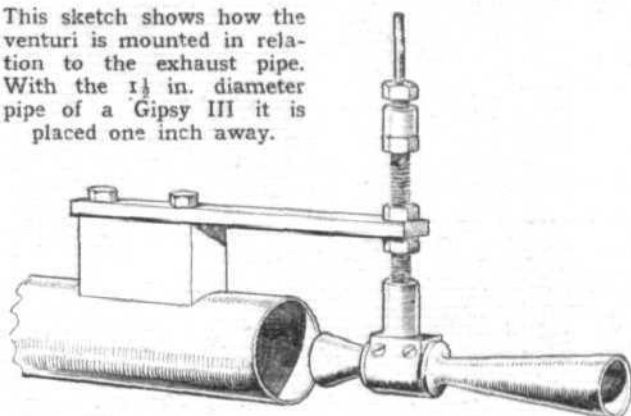
Recently tests were made with a Gipsy III engine. The nozzle of a venturi was fixed one inch away from the end of the 1½ in. diameter exhaust pipe, thereby avoiding obstruction to the free flow of the exhaust gases. With the aeroplane stationary the engine was revved up to mean flying speed, the manometer showing a pressure of .2 in. Hg.

A turn indicator of the new Schilovsky type was placed in the cabin and connected to the venturi by rubber tubing. With the engine running slowly, and before the machine had left the ground, the water gauge at once registered the equivalent of .1 in. Hg. and the gyro began to rotate, showing good acceleration.

When leaving the ground the vacuum rose to .15 in. Hg., and almost immediately the gyro attained maximum speed, when the Schilovsky gyro brake came into operation. In level flight against, or with, the wind on turns and in dives and climbs the gauge registered a vacuum of between .15 in. Hg. and .18 in. Hg.

At the conclusion of the test the venturi funnel was too hot to hold with the hand, but the pipe leading from it could

This sketch shows how the venturi is mounted in relation to the exhaust pipe. With the 1½ in. diameter pipe of a Gipsy III it is placed one inch away.



be touched quite easily. No soot could be observed in the venturi after the flight.

Patents for the invention have been applied for. The constructors of the device are Cooke, Troughton and Simms (Vickers, Ltd.), of Buckingham Works, York.

"Bright-hoving" Airport

IT will be remembered that in the description last week of the formal opening of the aerodrome serving Brighton, Hove and Worthing *Flight* praised the general layout of the flying ground and building. It is, therefore, interesting to note that the whole of the planning was in the hands of Mr. M. H. Volk, A.F.R.Ae.S. (as aeronautical consultant) and Mr. Stavers H. Tiltman, L.R.I.B.A., architect to the joint Airport Committee.

NUTS TO CRACK—No. 6

Below is another of Flt. Lt. Nicholas Comper's posers, this time of a rather more technical and debatable nature. The author's own theory will be found on page 374.

"We were engaged in putting a low-wing monoplane through airworthiness flying trials at Martlesham Heath and the Service pilots had reported that the directional control and stability were inadequate. Modifications were considered advisable, but as the fin and rudder surfaces were, if anything, larger than necessary there seemed little justification for any radical change.

"Still, something had to be done, so we geared up the rudder control to try to make its effect a little sharper. In doing this the strip of fabric covering the hinge gap between the fin and rudder was removed and I asked that it should not be replaced until I had made some tests with the gap uncovered, for it is well recognised that uncovered control surface gaps generally make the control heavy and unresponsive, and from a research standpoint I wished to test the control and stability under the worst possible conditions to start with.

"Well, I took off without any difficulty and, having climbed to 500ft., took my feet off the rudder bar. To my astonishment, the aircraft flew true and steady on a perfectly straight course. I depressed my left

wing and picked up a steady turn. Pulling my left wing up I was able, without any serious side slipping, to get back on to a straight course.

"Turning to right or left, engine on or engine off, the aircraft responded to the aileron control and required no use or corrective action of the rudder. The next test was to abandon the ailerons, and the same directional control was found possible with the use of the rudder only.

"This seemed absolute nonsense, for here was an aircraft with perfect directional control and stability, and the only changes made were an increase in the possible movement of the rudder, which could not affect the directional stability, and the uncovering of the hinge gap, which, in the light of experience, was more likely to make matters worse. Anyway, I landed and handed the job back to the Service pilots, who in turn reported that the improvement was bordering on the miraculous.

"The C. of A. was granted with a proviso that the hinge gap should be left uncovered.

"What curious aerodynamical effect was responsible?"



THE NEW BOY

Being Some Not-too-serious Thoughts, Based on Personal Experience, on the Topical Subject of Joining the Royal Air Force

By Ex-Pilot-Officer
F. W. RICHARDS



"THE Gods," said my companion, glancing at me lugubriously over the top of his beer mug, "move in a mysterious way their blunders to perform."

"By Gods," he continued, "I mean the blokes whose occupation it is to keep the office chairs warm in Air Ministry; and by blunders," he added with due modesty, "I refer to the scandalous passing-over of men like myself on the promotion lists."

Personally, I thought that Air Ministry's reasons for omitting to elevate Flight-Lieutenant Gainton in rank were probably more than adequate, but with the meekness of the completely ignorant searching for information from the completely knowledgeable, I asked: "What is their 'mysterious way'?"

To which Gainton replied: "It is known as sending communications 'through the usual channels,' and, believe me, these channels are nothing if not unusual, and closely resemble the mind of a woman in their complete lack of logic and their utter unfathomability; but as far as I can gather from twenty years of Service life, what happens is that you, for example, send in an application to be enlisted as a Short-Service Officer; within a week you receive an answer acknowledging the receipt of your communication, as I believe you have done, but this merely means that your application has reached Air Ministry."

"Passed to You"

"It now becomes the plaything of the Powers that Be, and is sent on a voyage of exploration to practically every officer in the Service, quite regardless of whether it concerns them or not, until finally the torn and ragged document, bearing your illustrious signature, the affirmation that you have never been convicted of anything worse than riding a push-bike without lights, and terminating with a few snappy remarks concerning your education, will return to the Air Ministry and the man to whom it was addressed, by the complicated system of elimination I have attempted to describe. Then things will happen; you will be asked to report at Air Ministry in an incredibly short time, regardless of whether you are in London or the Azores, to undergo your interview and medical. Two more beers, please, Sandy."

Eventually Gainton raised his foam-flecked moustache from the depths of his tankard. "There is only one thing which is incompatible with the traditions of Air Ministry about the manoeuvre I have described, and that is their eventual rapidity," he remarked in tones of sorrow, for Flight-Lieutenant Gainton affected an air of exaggerated gloom, no matter what he was doing, whether it was looking through the promotion lists, or playing one of

the three games at which he is alleged to have excelled.

"Is life in the R.A.F. really enjoyable, or not?" I asked.

"It is," replied Gainton, "the one form of employment in existence which does not form the ground for perpetual grouching on the part of all connected with it; in fact, I don't know the Air Force officer who would swop his job for any other having half as much again in pay. . . . Surely not yet, Sandy? When did you put the clock right? . . . Oh, all right. Good night; see you sometime, blokes."

Gainton's prognostications proved nothing if not accurate; in short, I waited six months while Air Ministry maintained a masterly silence and ignored my unimportant existence. I was then given two days before presenting myself at Kingsway to be interviewed.

I arrived wearing an old school tie and an expression of deepest gloom. I was ushered into a room full of wooden chairs and young men discussing aeroplanes, a subject of which I was at that time painfully ignorant. I shrank into a corner and wondered just exactly why I had come.

Half an hour later I came before the Presences with my mind a whirl of historical incidents connected with the time of the Inquisition. To my amazement I was smiled upon and offered a chair. I was then asked what games I played, why I wanted to join the R.A.F., and very little else, and lo! I was given a note to commend me to the attention of the Central Medical Establishment.

The chief medical tests for the R.A.F. are concerned with nerves, eyes and heart, and, as far as medical exams go, they are fairly hard. But the chief test at C.M.E. is one of Patience.

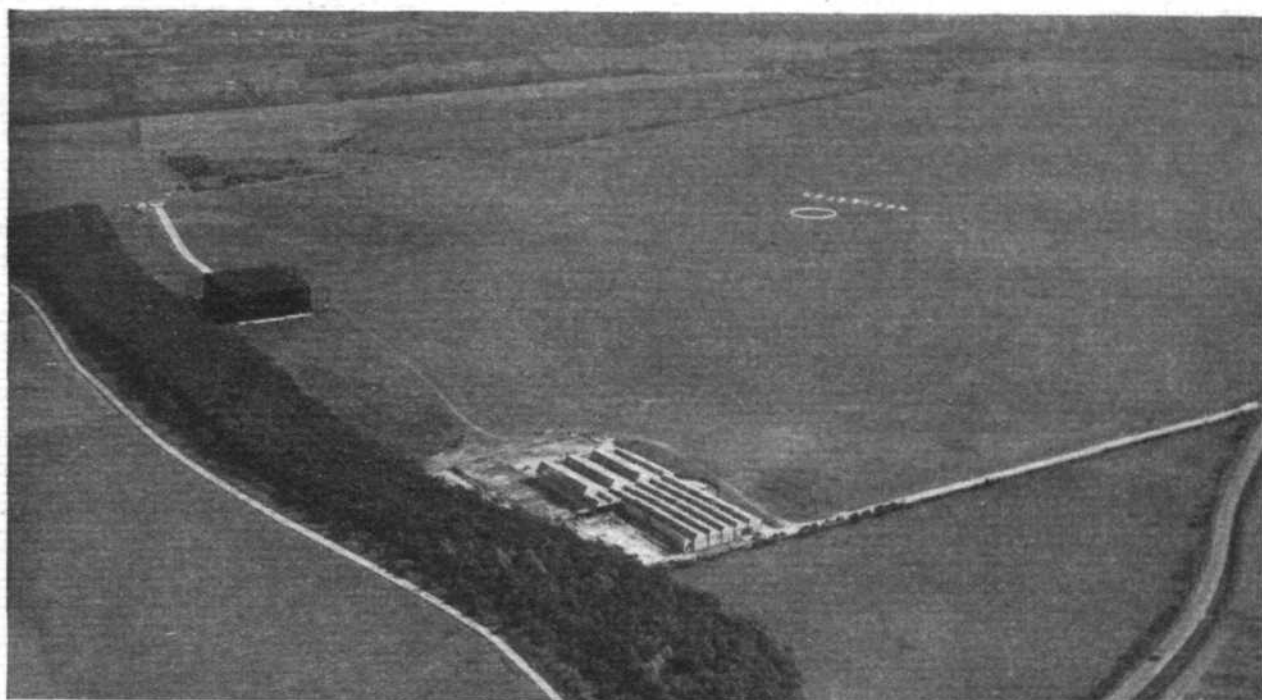
It is said that the male sex has perfected the fine art of loafing. This is not sufficient to face C.M.E.; you must master the even finer art of going to sleep when and where you wish, like a cat; believe me, I know.

Having eventually finished being examined, one goes home and shivers for several days until one is informed of one's fate at the hands of the doctors; and then, if one has been successful, one shivers still more at the thought of the mistakes one will make as a "new boy" in the Royal Air Force.

[In a forthcoming issue our contributor will relate his experiences at a Flying Training School.]

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



Rochester's Aerodrome : The Pobjoy works can be seen in the foreground, with Short Bros. erection hangar on the left.
(Flight photograph.)

THE WEEK AT CROYDON

A Swissair Record : On the Spot : New Lamps for Old : Accurate Navigation

LAST week Swissair made a record trip from London to Basle with a Douglas D.C.2 piloted by M. Gerber. A distance of between 460 and 475 miles was flown in 1 hr. 55 mins., tarmac to tarmac, with an actual ground speed of about 230 to 233 m.p.h. There was a following wind, of course, but it was only to be used to full advantage at 10,000 to 12,000 ft.—the usual height flown with this type.

Air line pilots here who fly Douglas machines often chuckle at the inaccuracy of English newspapers which give the machine a cruising speed of 165 m.p.h.—which is much more like its average operational speed. Modern aeroplanes have no special cruising speed, as this differs with the height flown and with the power percentage used. It is all very simple once people have shaken off the ancient superstition that a machine must have one top speed and only one cruising speed.

I must congratulate one particular newspaper on its far-sightedness. This paper recently stationed a photographer permanently at Croydon, and, in consequence, made a complete "scoop" with pictures of the Wapping fire on Wednesday of last week. Other photographers took about 50 or 60 minutes to reach Croydon or any other airport.

On Wednesday night there was a demonstration of the airport night lighting system, which has been in operation for some considerable time and has often been mentioned in *Flight*. Judging from the newspaper reports one would imagine that the whole system had been invented, patented, erected and put into operation during the course of Wednesday afternoon and evening.

A new pilot of the commander class, recently seen at Croydon for the first time in K.L.M. uniform, turns out to be M. Steinbeck, one of the senior pilots of D.D.L. (the Danish company), who will be attached to K.L.M. for a period of two years.

Capt. Horsey, of Imperial Airways, made three flights between London and Paris on Friday without seeing anything at all of the land and water beneath him except when quite

near each terminal. Navigation, in these days, even without the aid of wireless, is becoming extremely accurate. I heard of a case where the navigator told the pilot to put his nose down and go through the clouds at 45½ minutes past eleven, when he would be over Le Bourget. And it was so.

A Traffic Question

Cross-Channel steamship companies must be excessively prosperous, for the President of the Marine Engineers remarked in his presidential address recently that passengers carried by air across the Channel did not seriously affect the boat business, and would not do so for several years. When I read those words I had just seen an Imperial machine with thirty passengers, a big Dutchman with twenty, and a full Air France fourteen-seater arrive almost simultaneously at Croydon. Every air passenger is a first class passenger, and, whilst the cross-Channel air traffic at present is only 1-17th of the total, it has this year increased by 65 to 75 per cent. As I say, if 100,000 first-class passengers can be lost by the boat companies almost unnoticed, they must be doing well.

British Continental Airways will open a line between London, Brussels and Antwerp in the very near future. Olley Air Service moved "en bloc" to Shoreham Aerodrome last week for the inaugural ceremonies there. Capt. Olley himself reached Shoreham by the devious means of flying non-stop, with Sir C. Hyde as passenger, from Croydon to Strasbourg, and from there non-stop again to Shoreham, where a Customs officer was summoned by the ingenious method of broadcasting.

"Timber" Woods, of Surrey Flying Services, has just returned from an extensive charter tour in Scotland, and Capt. Hancock, also of S.F.S., reports a great increase in instrument flying instruction. It is interesting to note that men who have been blind flying on the air routes for years with big commercial machines are always keenly interested in the instrument flying course. It is the youngsters who talk as if they knew all about it.

A. VIATOR.

Commercial Aviation

THE EASTERN LINK

How Imperial Airways' Projected Hong Kong Extension will Connect the Eastern and Western Routes : Some Interesting Possibilities

YESTERDAY the D.H.86 *Dorado*, commanded by Capt. W. Armstrong, was due to leave Penang on the first of a series of six experimental flights between that place and Hong Kong, calling at Saigon, the terminal of the Air France eastern route, and at Tourane. The longest sea crossing involved is on the first section.

When this route is covered regularly it will actually be the first full connection between the western and eastern air routes, though Air France reach Hanoi on their regular service. From Canton the China National Aviation Corporation fly up the coast to Shanghai, and the Eurasian Aviation Corporation fly to Peking. In due course Pan American Airways will complete their experimental Pacific flights, and Canton will then be connected with the Philippines, Honolulu and the United States. P.A.A., of course, have a large share in China National, while Eurasian Aviation are partly owned by Deutsch-Luft Hansa.

In the meantime discussions by P.A.A. and the Royal Dutch Air Lines make it possible that the two may co-operate with a world-girdling service between San Francisco, the Philippines and Borneo at one end of the K.L.M. eastern route, and between England, Iceland, Greenland and New York at the other.

Pan American Airways have also, it appears, been in touch with the New Zealand Government, but a hitch has occurred at this end. The British Pacific Trust, the power behind General Aircraft and New England Airways of Australia, has announced that it is willing to interest itself in Kingsford Smith's Tasman Service.



In this map the new Hong Kong projection is shown in heavy lines and the various connections or future connections are indicated.

EX HESTON

After Dark : The Bristol Radio Station : Another Machine for Egypt : August Traffic

ALTHOUGH internal services have, on occasion, completed journeys in the dark, there has not yet been a service so scheduled that the arrival must be made by floodlight. United Airways announce that, on and after October 5, their daily service from Heston to Blackpool and the Isle of Man will call at Liverpool and will be extended three times weekly to Belfast. On Mondays, Thursdays and Saturdays passengers will be able to leave Belfast (the Ards Airport) at 14.45 hr. and reach London (Heston) at 18.10 hr.

As the days grow shorter this will, of course, involve an increasing proportion of night flying. Spartan Cruisers are to be used over water and D.H.89s over land. All aircraft used on this service will be equipped with radio, landing lights, Sperry and Reid and Sigrist instruments, and a Kollsman precision altimeter.

The Bristol radio station is carrying out tests and should be in working order when *Flight* is published this week. It will provide a third intersection to the bearings obtained by Heston and Portsmouth, and it will thus be possible to give a "fix" to any pilot flying a radio-equipped aeroplane in the Heston and Portsmouth zones.

The fourth new machine in Misr-Airwork's re-equipment programme left Heston for Egypt early in the morning of September 26. This machine, a D.H.89, is being flown out to Egypt by Mr. Bryan Thynne and carries as a passenger Kamal Eloui Bey, the managing director of the firm, who has been in London on a short business visit.

A comparison of August traffic figures with those for the same month last year shows that the commercial trend is again apparent. The total of aircraft movements (take-offs or landings) in August, 1934, was 3,284, of which 1,255 (38 per cent.) were commercial. The total in August, 1935, was 4,043, of which 1,995 (49.5 per cent.) were commercial. Thus, the balance between private and commercial flying at Heston is now even—within a few decimal points. The increase in total aircraft movements on the figure for August last year was 23 per cent. Turning to airline passengers, we see a 43 per cent. increase on the total number of passengers handled in August last year. Jersey Airways carried 1,717 passengers on the Heston route in August, an 18 per cent. increase on last year's figures. Spartan Airlines carried 1,668 passengers, United Airways 238, P.S. and I.O.W.A. 525 and

the Inner Circle 170. P.S. and I.O.W.A. carried, too, 31,800 lb. of freight. The last-mentioned company closed down its London services for the winter on September 22.

Owing to increased business Commercial Air Hire has taken on a fourth pilot, Mr. S. T. A. Scott, late of Provincial Airways. The Monospars now used on the Inner Circle Airline are shortly to be replaced by larger-capacity machines—Dragons—and one has already been purchased.

On Tuesday of last week Mr. P. W. Lynch-Blosse put up two very excellent performances in bad weather. In the morning he left Blackpool in charge of the United Airways machine and immediately lost sight of the ground. Flying on bearings given by Heston he passed over the aerodrome, and a reciprocal bearing brought him down through the clouds, then at about 500 feet, to a landing. He had not seen the ground once between the two airports. In the afternoon he left for Cowes on Spartan Airlines. Again flying without a sight of the ground he finally came down through the clouds on instructions from Portsmouth, and landed passengers at Bembridge. The clouds were there down to about 100 feet, and he successfully reached Cowes by flying round the coast.

The Heston Accident

THE report on the crash at Heston on July 16, in which two passengers lost their lives, has now been published, and the accident is "attributed solely to faulty airmanship or errors of judgment on the part of the pilot, causing the machine to stall." Although the D.H. Dragon was overloaded to the extent of 90 lb. according to the C. of A. applicable to the machine, its distribution was reasonable, the machine was airworthy, and both engines were running satisfactorily.

One can only praise the vicelessness of the Dragon when stalled and deplore the fact that a fire should have broken out after such a relatively minor impact. The particular area over which the Dragon began to lose height has seen several incidents, and it appears possible that there is something in the nature of a down-current there. A few experiments would not come amiss.

Atlantic Development

THE Irish Transatlantic Corporation, Ltd., has, it is reported, obtained an option on 600 acres of land at the point nearest to the area in Lough Foyle, North Ireland, which is considered most suitable for a seaplane base.

A Modern Problem

ON October 1 the daily Air France service between Cannes and Marseilles was due to cease operation. The service has been maintained for five years, but the Cannes aerodrome is now considered to be too small for modern high-speed types. The London, Paris and Marseilles section, of course, will still be run, and the latest news suggests that the Cannes Municipality have been goaded into action concerning the aerodrome.

Air France Entertains

ONCE again the guests at the Air France annual dinner and dance had a chance of realising the enormous number of people who are connected with air travel and, in particular, with its booking side.

M. Henri Lesieur, the passenger traffic manager of Air France, was in the chair at the Trocadero restaurant and, in proposing the toast of the Travel Trade, he mentioned the use of the D.H. Comet on the South American mail service and the fact that passengers would, he hoped, eventually be carried over the route. In due course, he said, 200 m.p.h. machines would be used on the eastern route, and he wished M. Richet, who is shortly to go out to Saigon, the best of luck. M. Richet has spent some six years in the London office under Mr. Bamford. Mr. E. Huskisson, the general manager of Cook's, replied.

Proposing the toast of Air France, Mr. W. Gourlay, the European general manager of the American Express Company, told several very good stories, and Mr. J. N. Bamford, after a reception which indicated his immense popularity, replied.

New Crilly Services

ON Tuesday Crilly Airways were due to open two new services, one linking Croydon with Bristol and the other with Norwich. The times of arrival link the services with the Imperial Paris departures.

The Channel Island Aerodromes

WORK is now proceeding rapidly at the new Jersey Airport, which is situated near St. Peter's Barracks and within ten minutes' walk of St. Peter's Church. Pipes are being laid for drainage, and a new road on the north side is being made to replace the one which has been absorbed in the airport area. The radio station, of course, has been in working order for some time on the east side, near the road, and buildings, hangars and offices will be erected nearby.

The area comprises seventy-four acres, of which thirty has already been sown. It is hoped that the airport will be ready for use in March.

In Guernsey the States Aerodrome Committee has published a second report on the choice of a site for an island aerodrome. Special attention has been given to three sites—L'Erée, L'Ancrese and La Villiaze. The Committee still recommends La Villiaze, situated in the centre of the island, as the ideal spot, but suggests, however, a smaller area than that stated in the first report. The Committee has been in consultation with Messrs. Norman, Muntz, and Dawbarn, who favour the erection of the airport at La Villiaze. The matter will shortly come up for consideration before the local parliament.

With the approaching completion of the Alderney Aerodrome regular daily services to that island should be started during the early part of this month. Connection will be made with Guernsey by means of a Saro Windhover until the authorities there make their own aerodrome.

Meanwhile, Jersey Airways continue to break all their own records, having carried nearly 6,000 passengers during the month of August and 18,000 so far during the year.

CROYDON'S DARKNESS LIGHTENED

THE problem presented by Croydon's hill-and-dale surface must have been a tough one for aerodrome lighting engineers, but the complete system is now in full swing, and on Wednesday night of last week the efficiency of the eight G.E.C. floodlights was shown at a special demonstration.

The scheme, which takes the place of the pair of portable floodlights previously used, provides for any two of the eight 6-kW. lights to be switched on according to the direction of the wind, so that the incoming aircraft may land across the lights and down the beam. An after-dark flight which we made from the aerodrome in the Imperial Airways D.H.86 *Dadalus* showed that in conjunction with the very complete system of pulsating orange boundary lights (shortly to be made continuous in accordance with international agreement), the Neon beacon, the illuminated wind tee, and the red obstruction lights, the new system should give the incoming or outgoing pilot all the help he requires.

An interesting point is that the General Electric Company have contracted to install similar systems, though mainly on a smaller scale, on the principal aerodromes on the Empire route across India—as already recorded in *Flight*, these aerodromes are Karachi, Hyderabad, Uterlai, Badhal, Delhi,

Cawnpore, Allahabad, Gaya, Calcutta, Akyab, and Rangoon. Plans are also in hand for equipping fourteen aerodromes on the route beyond Singapore and on the Capetown route.



Imperial Airways D.H.86 *Dadalus* on the Croydon tarmac under the new floodlighting. The line in the background is the black and white boundary fence. (*Flight* photograph.)

Commercial Aviation

Hillman's Amalgamate

UNTIL the company moves, lock, stock and barrel, to Gatwick airport later this year Hillman's Airways are running to a temporary winter time-table.

On and after October 7 there will be two daily services to Paris, two week-day services to Antwerp and Brussels, one week-day service to Glasgow, *via* Speke and Newtownards, and an additional service between Speke and Glasgow, *via* Newtownards.

Most interesting of all is the news that, subject to confirmation from the shareholders, Hillman's Airways, United Airways and Spartan Air Lines are to amalgamate and to reappear as a new company. Adequate working capital will be provided by Erlangers and Whitehall Securities, who will subscribe for shares in equal proportions. United Airways, of course, have a seventy per cent. interest in Highland Airways and Northern and Scottish Airways.

Last week, incidentally, Hillman's put up some very fast times on both their Paris and northern services. A D.H.86 did the trip to Le Bourget at an average of 168.75 m.p.h., and a D.H.89 flew from Liverpool to Abridge at 166.15 m.p.h.

More Newspapers

LAST week, at the peak of the gales, the Hon. Mrs. Victor Bruce flew to Paris in Commercial Air Hire's Paris Dawn Express on important business in connection with the early morning newspaper contract. To state that the business was satisfactory is putting it mildly, as since last Monday C.A.H. has taken over the complete contract from Air France for the transport of the early morning newspapers. The average daily load will be increased from 900 to 1,500 kilos., making a substantial load. The Avro 642 will continue to carry the bulk of the consignment, while new D.H. Dragons will take care of the remainder. For many years Air France has regularly operated this service on behalf of Messageries Hachette.

Coventry's Municipal Aerodrome

THE work of clearing the site of Coventry's Municipal Aerodrome at Baginton has just started. A large number of workmen have been engaged on the preparation of seventy acres of land—sufficient for initial operations. In all there is a total acreage of 237 to be cleared. The land was formerly a sewage farm, and it would be difficult to imagine a more ideal site.

The adjoining site, upon which sheds and buildings will be built for Armstrong-Whitworth, has already been marked out.

New Aerodrome at Rangoon

THE scheme for the new aerodrome in Rangoon is now ready, according to an official statement. It remains only to decide whether the present aerodrome should be extensively improved or whether a new site should be selected.

The rumour that if a new aerodrome is denied, the present one will be used for military aircraft is rebutted by Mr. T. Tymms, Director of Civil Aviation.

On the Colombo Route

TRICHINOPOLY will be an important station on the projected Karachi-Madras-Colombo air route, while Villipuram and Rameshwaram will only be provided with landing grounds to be used on occasions of emergency. The Trichy aerodrome will be provided with a hangar, and a site has been selected, two miles south of the aerodrome, for the location of a radio station.

The construction of a civil aerodrome for Madras, which has been under consideration for a year, will start in three months. By that time the Government will have decided on the site. At Colombo the aerodrome is progressing rapidly, and it is hoped that the Karachi-Madras-Colombo service will be in operation before the end of this year.

ROYAL AERO CLUB OFFICIAL NOTICES

THE Committee of the Royal Aero Club met on Wednesday, September 25, at 5 p.m. *Present:* W. Lindsay Everard, M.P. (in the chair), A. J. A. Wallace Barr, Cdr. James Bird, Flt. Lt. C. Clarkson, Maj. C. J. W. Darwin, Lt. Col. M. O. Darby, G. H. Wilson-Fox, Maj. A. Goodfellow, Capt. A. G. Lamplugh, Maj. R. H. Mayo, Maj. H. A. Petre, F. Handley Page, H. E. Perrin, Secretary.

The following new members were elected: Jean G. Batten, F. L. Crilly, Capt. H. Farquhar, Wm. Humble, Jun., K. Tschudi, Constance R. Leathart, Lady Loch, P. R. May, K. J. Nalson, G. S. Ogilvie, S. R. Sherman, Maj. R. H. Thornton, F. B. Worman, M. H. Findlay, C. E. Jobling.

Aviators' certificates were granted to Nos. 12974 to 13215.

Gliding certificates were granted as follows: "A": Nos. 462 to 496. Eighteen qualified for "B" and five for "C" certificates.

The following matters were dealt with by the committee: King's Cup Air Race, Weather Reports, Compulsory Third-party Insurance, revision of Landing Charges at State-owned Air Stations.

Gliding Record.—The following performance was confirmed as a British Duration Record for Gliders: John C. Neilan on a Professor, at Sutton Bank, on July 16, 1935. Duration, 13 hr. 7 min.

International Conference.—The Fédération Aéronautique Internationale has accepted the invitation of the Royal Aero Club to hold its Annual Conference in London in 1937.

Gold Medal to Mr. C. W. A. Scott.—A further honour has been conferred upon Mr. C. W. A. Scott, the winner of the England-Australia Air Race. The Fédération Aéronautique Internationale, at its Annual Conference held at Dubrovnik on September 6-12, awarded its Gold Medal to Mr. Scott. The Fédération is composed of all National Aero Clubs throughout the world, and the Gold Medal is the highest award which can be bestowed in connection with aviation. Lt. Col. M. O'Gorman represented the Royal Aero Club at the Dubrovnik Conference.

International Rally.—The Royal Aero Club has decided to hold an International Air Rally in September, 1936. Invitations will be issued to all European countries to be represented

at this Rally, and the foreign visitors will be the guests of the Royal Aero Club and private owners during the period of the Rally. The following committee has been appointed to draw up the programme for the Rally: Mr. Lindsay Everard, M.P. (Vice-Chairman of the Royal Aero Club), Maj. H. A. Petre, H. Gordon Selfridge, Jun., Mrs. N. Norman, and Mrs. A. S. Butler.

It is hoped that all private owners will support this Rally, and they are requested to communicate with the Secretary, Royal Aero Club, 119, Piccadilly, London, W.1. At present it is impossible to give further details of how the event will be organised or how the guests will be entertained, but the committee would welcome suggestions from other private owners, as it is hoped that the entertaining will be as representative as possible.

Touring Abroad.—The Private Owners and Air Touring Committee of the Royal Aero Club has recently had occasion to secure the immediate release of aircraft which had been held up abroad for breaches of regulations, which were entirely due to ignorance on the part of the pilot. It is most essential that air tourists going abroad for the first time should make themselves thoroughly acquainted with the regulations of the countries they propose to visit and thus avoid unpleasant incidents. The Touring Department of the Royal Aero Club will be pleased to give the fullest information to air tourists going abroad.

Weather Reports.—The Royal Aero Club, through its Vice-Chairman, Mr. W. Lindsay Everard, approached the Secretary of State on the question of weather reports, and it will be interesting to private air tourists to know that the weather reports for the routes Paris, Brussels, and Amsterdam are now broadcast twice daily at 09.30 and 15.30 hours on a frequency of 254 kc/s (1,181 m).

It is hoped that clubs and aerodromes will co-operate with the Royal Aero Club and whenever possible listen-in to these reports and display them on their notice boards in club houses, so that private owners going abroad may benefit from the latest information.

These reports will be displayed on a notice board in the Royal Aero Club, and private owners may ring up Grosvenor 1246 for the latest information.

Royal Aero Club. HAROLD E. PERRIN, Secretary.
119, Piccadilly,
London, W.1.

MODELS

The Model Engineer Exhibition : Lessons of a Seaplane Contest

A Representative Show

THE Seventeenth Model Engineer Exhibition, which concluded last Saturday at the Horticultural Hall, Westminster, included over fifty model aircraft, many of them of real merit. Only a few of those most likely to be of interest to readers of *Flight* can be mentioned here, but this does not imply that the others were indifferent or commonplace.

The *pièce de résistance* on the S.M.A.E. stand was the 8 ft. span petrol-engined high-wing monoplane of Messrs. A. T. and A. M. Willis. It is hoped to publish an illustrated description of this machine in due course, meanwhile it must suffice to say that the model is "typically Willis" in form, structure and behaviour, which means very good indeed. It has "Sky-Rover" stability, also the famous "Sky-Rover" glide! The engine is an inverted Atom Minor. On the same stand were Mr. Wilson's Shelley Cup-winning seaplane and the beautifully made Leopard Moth of Mr. Gillett (P.M.A.L.) which flew so well in the recent C.S.S.A. contest.

Several of the twenty-two models on T.M.A.C. stand were shown in skeleton form—an excellent idea. Scale models were much in evidence, including small editions of Hart, Fury, Swift, Streak, Tiger Moth and Puss Moth, and a fine large Leopard Moth (1½ in. to 1 ft.), built by Mr. Henery, which flies as well as it looks. One would like to see more scale models built to this scale, or possibly ½ in. to 1 ft. In addition to the impressive appearance this would enable a greater wealth of detail to be incorporated without seriously affecting the flying performance.

The Northern Heights M.F.C. stand contained three very interesting models, Mr. Sparey's scale *Pou-du-Ciel*, the upper wing incidence being controlled by a tiny winch; Mr. Sparrow's Mew Gull, constructed largely of cartridge paper, and Mr. Rippon's petrol-engined mid-wing "pusher." One presumes that the wealth of bamboo outrigger and wire bracing in this last machine is dictated by a protective concern for engine and propeller.

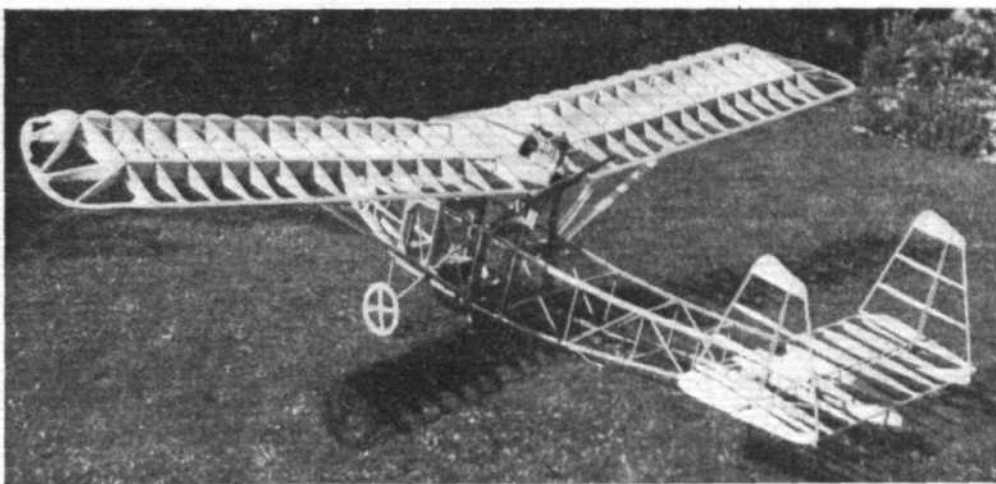
In the Competition Section of the Exhibition the aeroplane prize was deservedly awarded to Mr. S. F. Banks (Hayes Club) for his non-flying Dragon Rapide, a perfect piece of work, with such details as wireless aerial reel, and seat-back pockets (complete with paper bags!) faithfully reproduced.

Seaplanes

AS last year, the recent S.M.A.E. Seaplane Contest for the Sir John Shelley Cup attracted numerous entries, despite the discouraging risk of swamped models, and the necessity of journeying to Danson Park, Welling.



Another parasol design, referred to in the adjacent column.



This striking parasol monoplane has a wing-span of 8 ft. 10½ in. and is powered with a ½ h.p. two-stroke engine, driving a pusher airscrew, on the trailing edge above the fuselage. Mr. L. S. Wigdor is building the machine, and designed it with the help of Mr. A. R. Yeomans. The wing section is by Grant, of America, and holds the world's duration record of 64-odd minutes.

There were twenty-five models, mostly of the popular light weight tapered-high-wing variety, though a few had straight-chord wings. No low-wing types appeared, but Capt. Bowden flew a most elegant biplane with generous stagger, and fitted with a variable-pitch propeller, the blade angle of which was governed by the power output of the rubber motor, through a simple and ingenious mechanism. The models had to undergo a short flotation test, and then the average duration of three rise-off-water flights was taken.

The two- and three-float systems were employed, the floats in some cases being elaborately shaped, others being vee-keeled, and some being stepped. No model this year had a single central float, or an air vent behind the step. The contest results bore out last year's observation that the most successful models were those having two main floats and a smaller tail float, all of the flat-bottomed pontoon type. Generally speaking, models which did not take off in a second or two by virtue of lightness failed to rise at all, however well they might plane.

The best flight was one of 95.2 seconds, by Mr. Ives, but rubber fracture resulted in a damaged model, thus preventing the requisite number of flights being made. The Cup was won by Mr. P. L. Wilson (S.M.A.E.) with an average of 49.7 sec. His model weighed 4 oz., had 200 sq. in. of wing surface, tapered wings of 46 in. span, and three pontoon floats. Mr. W. Worden (T.M.A.C.), scored 47.7 sec., and Mr. S. R. Crow (Blackheath M.F.C.) 39.7 sec., both with tapered-high-wing three-pontoon models.

T.M.A.C. held their Seaplane Contest in conjunction with the above event, and Mr. W. Worden's average of 47.7 sec. in the S.M.A.E. event won him first place in T.M.A.C. Contest. Mr. J. Worden scored 40.96 sec. with a tapered-high-wing three-pontoon model, and Mr. G. J. Liggitt scored 39.58 sec. with a straight-chord type.

Parasol

SUGGESTIVE of Continental full-size practice is the parasol monoplane seen on the left. Built by Mr. E. Holmes, of London, W.I., it is—or was (Mr. Holmes rather ominously uses the past tense)—of 4 ft. span and weighed about 12 oz. The fuselage was almost *monocoque*, having only two longerons; its covering was ⅜ in. balsa, prevented from splitting by a covering of thin silk.

The grand rally organised by T.M.A.C. having been washed out by bad weather, it will now be held at Wimbledon on October 13, from 11 a.m. until dusk.

Mr. J. W. Mason, airport manager at Ronaldsway, in the Isle of Man, is anxious to hear from enthusiasts with a view to forming a model flying club in the neighbourhood.

Butler's, Wade Street, Littleover, Derby, send a catalogue of their ½ h.p. model aero engine (four-stroke 200-5,000 r.p.m.) which is sold at 9s. 9d. as a set of unfinished castings, or 25s. 11d. as finished castings.

HERE and THERE

The "Dragonfly"

THE new De Havilland D.H.90, a twin-engined biplane which incorporates a number of interesting features in its design and construction, will be marketed as the "Dragonfly." Particulars are expected to be released in the near future.

Load of the Heyford

IN the article on No. 10 (Bomber) Squadron published in *Flight* of September 12, 1935, the use of the expression "disposable load" may have conveyed the impression that that of the Handley Page Heyford is 2,722lb. The actual load carried by this machine is, of course, very much greater, as will be realised when it is pointed out that a typical military load is 2,967lb., including a crew of four. Petrol and oil may account for 3,242lb., bringing the total load up to 5,209lb.

The Phoenix

THE new high-wing monoplane which Heston Aircraft, Ltd., has had under construction for some months was finished recently in its essentials and has passed all its official tests at Martlesham. It is now back in the shops for "Rum-bolding"—otherwise to have its cabin equipment and interior decorations finished. The machine was illustrated in *Flight* of September 19.

Inexpensive Holidays

THOSE interested in inexpensive holidays abroad would do well to investigate the new scheme organised by Swiss Hotel Plan (London), Ltd. The centres covered by the scheme, incidentally, are well served by air lines.

"Nuts to Crack" Solution

(See p. 367)

One possible solution is that on this particular aircraft the position of the fin and rudder, although ideally placed from a design standpoint, happened to coincide with a nasty area of side-swirl from the airscrew slipstream, and were, perhaps, also very much affected by airflow disturbances set up from the forward portion of the fuselage.

In effect, the fin and rudder were flying at a stalled angle of incidence in these side-swirls, and opening the hinge gap between the fin and rudder acted like a slot in destroying the stalled burble.



The Fokker C.X two-seater fighter, bomber, reconnaissance machine, or what you will, fitted with the 600/640 h.p. Rolls-Royce Kestrel V. Alternative engines are the Hispano Suiza Ydrs, Bristol Pegasus IV and Gnome Rhone 14 Krsf Mistral Major. The performance with the two foreign engines is rather higher, but not sufficiently so, it would seem, to outweigh the very much shorter range. With the Hispano this is 410 miles, compared with 515 from the Kestrel. The more powerful engine gives 214 m.p.h. at 13,000 ft., whereas the Kestrel gives 199 m.p.h. at 14,000 ft.



A FAST TWO-SEATER
FROM
THE NETHERLANDS

PUBLICATIONS RECEIVED

Wings Across Continents (The K.L.M. Amsterdam-Batavia Line). By E. Rusman. Price 2.25 guilders, Andries Blitz, Amsterdam, Holland.
Let's be Gay. By James Riddell. Price 5s. Hutchinson and Co. (Publishers), Ltd., 34, Paternoster Row, London, E.C.
K.L.G. Plug Recommendation Booklet for Cars, Aircraft Engines, etc. K.L.G. Sparking Plugs, Ltd., Putney Vale, London, S.W.15.
Wireless Telegraphy Notes for St den's, compiled by W. E. Crook. Price 7s. 6d., Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2.
Coolidge Calendar for October, Fletcher Miller Ltd., Alma Mills, Dukinfield, Manchester.
National Advisory Committee for Aeronautics Reports: No. 515: Full-Scale Wind Tunnel Tests of a PCA-2 Autogiro Rotor, by J. B. Wheatley and M. J. Hood, price, 5 cents. No. 519: Spinning Characteristics of Wings, I—Rectangular Clark Y Monoplane Wing, by M. J. Bamber and C. H. Zimmerman: 10 cents. No. 521: An Analysis of Longitudinal Stability in Power-Off Flight, with Charts for Use in Design, by C. H. Zimmerman: 10 cents. No. 523: The Influence of Wing Setting on the Wing Load and Rotor Speed of a PCA-2 Autogiro as Determined in Flight, by J. B. Wheatley: 5 cents. No. 525: Some Effects of Injection Advance Angle, Engine-Jacket Temperature, and Speed on Combustion in a Compression-Ignition Engine, by A. M. Rothrock and C. D. Waldron: 10 cents. No. 526: Noise from Two-Blade Propellers, by E. Z. Stowell and A. F. Deming: 5 cents. No. 527: Air Flow in a Separating Laminar Boundary Layer, by G. B. Schubauer: 5 cents. No. 531: The Effect of Water Vapour on Flame Velocity in Equivalent Co-O₂ Mixtures, by E. F. Flock and H. K. King: 5 cents. No. 532: The Soap Bubble Method of Studying the Combustion of Mixtures of Co and O₂, by E. F. Flock and C. H. Roder: 5 cents. Reports obtainable from Superintendent of Documents, Washington, D.C., U.S.A.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

AIRCRAFT PROPELLERS, LTD. Private company, registered September 23. Capital: £3,000 in 105 shares. Objects: to take over from the parent company, Helicopter, Ltd., under licence the sole manufacturing, selling and distributing rights of Twin Air Propeller (Patent No. 33359/34), and to design, build, etc., propellers, aeroplanes, etc. Directors: Victor Dibovsky, 8, Craven Hill, Lancaster Gate, London, W.; Samuel Boope.

BRITISH AERO COMPONENTS, LTD. Registered as a private company on September 23, with a nominal capital of £100 in £1 shares. Objects are to manufacture and deal in parts of and accessories for aeroplanes, etc. So long as the British Piston Ring Company, Ltd., holds 51 per cent. of the issued capital, they may appoint any persons to be directors. Solicitors: R. A. Rotherham and Co., 38, Bayley Lane, Coventry.

AIRWORTHINESS LTD. Registered as a private company on September 26. Nominal capital, £1,000 in £1 shares. Objects: to carry on the business of a flying school and the training of apprentices for aircraft engineers, and to manufacture and repair aircraft, etc. First directors to be appointed by the subscribers. Solicitors: Clifford Turner and Co., 11, Old Jewry, London, E.C.

INCREASES OF CAPITAL

PETERS ENGINES AND AIRCRAFT, LTD., Victoria Works, Avenue Road, London, N.W.10.—Nominal capital has been increased by addition of £5,000 beyond registered capital of £5,000. Additional capital divided into 4,000 6 per cent. cumulative preference shares of £1 each and 20,000 ordinary shares of 1s. each.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

(Published October 3, 1935.)

- 6362. AUTOMOTIVE PRODUCTS CO., LTD., and BROWN, F. V.: Fluid-pressure jack or like devices (434,493).
- 7024. JONES, W. H.: Propellers or screws (434,604).
- 7390. FRASER, H.: Switching arrangements of overhead tracks or railways for cars, aircraft, and the like (434,534).
- 12011. PORJOY AIRMOTORS, LTD., and PORJOY, D. R.: Valve seats of internal-combustion engines (434,618).
- 27293. BALLU, A. R.: Arrangement of propellers, more particularly of variable-pitch propellers (434,567).